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Learning Alliances in Water Sanitation and Hygiene: scaling innovation in service delivery in sub-Saharan African Countries

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Abstract

Learning Alliances are a relatively new approach to emerge within the Water, Sanitation and Hygiene (WASH) sector and seek to enhance the institutionalisation and scaling up of innovations in service delivery. In the context of WASH, Learning Alliances place an emphasis on establishing multidisciplinary interconnected platforms for interaction at different institutional levels in the sector, in order to address aspects of service delivery. This thesis examines a case of a project taking place in Burkina Faso, Ghana and Uganda, which used a Learning Alliance approach to programme management. The project was aiming to build the capacity in the area of technology assessment and introduction through action research, in the development of tools which could be used by stakeholders in the sector.

The paper draws from forty semi-structured key informant interviews, one focus group discussion and a further 52 Most Significant Change stories (Davis and Dart 2005), conducted among individuals taking part in the project or otherwise exposed to it through dissemination activities.

Applying the Learning Alliance approach has meant stakeholders have been able to tailor project innovations to the local context. Capacity has also been built among those taking part in the alliance both in terms of technology assessment and the use of the tools. However, the study has revealed certain difficulties with institutionalising externally developed innovations in a short three year project timeline.

Further research is needed to investigate the processes behind diffusion and institutionalisation of innovation in WASH Learning Alliances. Creating a favourable environment for ongoing support and implementation of innovations in service delivery should be a key area of focus for Learning Alliances going forward.

Keywords:
Learning Alliance / Water / sanitation /Technology / Assessment/ Capacity building / Service delivery

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Abbreviations

ATC – Appropriate Technology Centre (Uganda)

CWSA – Community Water and Sanitation Agency (Ghana)

DGRE – General Directorate for Water Resources (Burkina Faso)

EHSD – Environmental Health and Sanitation Directorate

INGO – International Non-governmental Organisation

JMP – Joint Monitoring Programme

KNUST – Kwame Nkrumah University of Science and Technology

NGO – Non-governmental Organisation

MDGs – Millennium Development Goals

MoU – Memorandum of Understanding

MSC – Most Significant Change

PN – AEPA National Drinking Water and Sanitation Supply Programme (French Abbreviation)

TAF – Technology Applicability Framework

TIP – Technology Introduction Process

TREND – Training, Research and Networking for Development (Ghana)

WASH – Water, Sanitation and Hygiene

WASHTech – Water Sanitation and Hygiene Technology - Project

WHO – World Health Organisation

SKAT – Swiss Centre for Appropriate Technology

1. Introduction

Huge progress has been made towards improving access to WASH services over the last two and a half decades. Since 1990, 1.9 billion people have gained access to improved sanitation facilities and an additional 2.1 billion people have access to improved water sources (WHO/UNICEF-JMP 2013 Update). However, huge challenges lie ahead. 2011 figures estimated that 2.5 billion people lacked access to adequate sanitation and 768 million people were still without access to an improved water source (WHO/UNICEF-JMP 2013 Update). There are also large disparities in access to WASH services across the globe. Most notably, Sub-Saharan Africa has the lowest levels of coverage for water and sanitation in the world and current projections suggest many countries within the region are unlikely to meet the MDG targets (WHO/UNICEF-JMP 2013 Update). Sub-Saharan Africa's increasingly expanding population, which is predicted to grow faster than anywhere else in the world over the next 50 years (United Nations, 2004), together with the impacts of climate change and declining freshwater availability (Röling, 2002), are likely to compound the situation further.

In this increasingly complex, uncertain and challenging environment, new, innovative solutions to problems of WASH service delivery are needed; solutions which take into account a diverse range of stakeholder perspectives (Pahl-Wostl. et al. 2007; Smits et al. 2007). It is no longer feasible to take a technocratic approach to WASH provision. As Pahl-Wostl et al. (2007) observe; "A particular group of experts or stakeholders can no longer learn on behalf of all stakeholders". This realisation has led to a paradigm shift in the way service delivery is viewed in the WASH sector (Cortner and Moote 1993, Ward 1995, Gleick 2003, Pahl-Wostl 2007a,b). Participatory management, involving all the stakeholders concerned with a problem, is becoming increasingly accepted as the desirable means of service delivery. Consequently, development organisations are shaping their interventions and looking to bring innovative practice in service delivery through innovative participatory approaches.

A key factor in addressing challenges in service delivery is the sector's ability to scale-up innovations to ensure the sector as a whole can benefit. Historically, such participatory interventions (particularly in the rural WASH sector), have worked at the community level to identify problems and develop locally appropriate innovative solutions. However, Moriarty et al. (2005) suggest such community level interventions typically focus on the particular project in hand rather than considering whether the innovation could be scaled up and contribute to the wider development of the sector.

Such interventions, for example, rarely acknowledge the role of "intermediate organizations", like local government, Non-Governmental Organisations (NGOs) and the private sector, in supporting the uptake and implementation of new approaches (Moriarty et al. 2005; Smits et al. 2007). This is in spite of the fact that these organisation are thought to be crucial in the scaling process, as they provide support in areas such as: technical assistance, access to information and securing supply chains for spare parts (Schouten and Moriarty, 2002). The role of national level stakeholders is also ignored by many participatory research projects and these organisations are vital in policy formation around sector-wide approaches, disseminating new practice and financing new initiatives.

Bypassing these organisations often results in the implementation of innovations which are inappropriate at a local level because they fail to take into account institutional capacity or legislation (Moriarty et al. 2005). There is also no creation of ownership for the intervention at the national or intermediate levels or capacity to support its implementation. Further, a project-based approach to implementation has often meant that the focus has been on developing innovative solutions, while insufficient attention is paid to raising awareness of the innovation within the sector (Moriarty et al. 2005). All of these factors mean that innovation is unlikely to reach scale, the necessary changes in sector policy and practice are not achieved and the sector-wide adoption, crucial for cohesive service delivery, fails to materialise (Smits et al. 2007; Lockwood and Smits, 2011).

The frustrations surrounding the apparent inability to scale up innovation in service delivery has lead development organisations in the WASH sector to seek different methods of scaling their innovations. One of the most promising approaches to emerge in recent years is that of Learning Alliances. Learning Alliances aim to address some of the aforementioned barriers to scale up, by working within the sector's institutional framework with an emphasis on multidisciplinary stakeholder involvement. A central premise behind the approach is to place as much weight on the process of scaling-up and embedding an innovation as to the innovatory process itself (Moriarty et al. 2005).

Drawing from the experiences of stakeholders involved in a Learning Alliance addressing sustainable technology use in sub-Saharan Africa, this qualitative study explores the mechanisms behind the institutional adoption and scale up of service delivery innovations. The paper also identifies the ways in which using a Learning Alliance approach may contribute towards capacity development of those taking part.

The Water, Sanitation and Hygiene Technologies (WASHTech) project was a European Commission 7th Framework programme funded initiative, taking place in Burkina Faso,

Ghana and Uganda. The project sought to build capacity in the assessment and introduction of technologies within these countries, with a view to scaling up their innovations in other developing country contexts around the world. The basic premise behind addressing these issues was to improve the sustainability of technologies introduced into developing countries and therefore improve service delivery and access to water, sanitation and hygiene services. A consortium of eight development partners from African and European countries was formed for the purpose of programme implementation. Using participatory methods, the project worked with stakeholders at different institutional levels to develop and refine tools, which could be used for the purpose of assessing technologies for their applicability to local context and facilitate the introduction and scale up of suitable technologies.

Research Aims and Objectives

Aim:

To develop understanding of the mechanisms behind capacity building, institutionalisation and scale up of service delivery innovations in the context of project based Learning Alliances.

Objectives:

1) Measure the changes in knowledge, and attitudes towards WASH technologies among those taking part in the project Learning Alliances and identify the mechanism behind these changes.
2) Measure any changes in levels of coordination between stakeholders from different parts of the sector resulting from involvement in Learning Alliances and identify the mechanisms behind these changes.
3) To measure changes in attitudes towards WASH technology assessment and introduction among those taking part in Learning Alliances and identify the mechanism behind these changes.
4) To measure stakeholder perceptions of the innovations developed by the WASHTech Learning Alliance.
5) To identify the main mechanisms behind the institutionalization of service delivery innovations developed by Learning Alliances within the participant countries.
6) Identify the contextual and programmatic factors which have helped or hindered the scaling up of service delivery innovation developed by Learning Alliances within the respective countries.

2. Literature review

2.1 Learning Alliances origins and concepts

The emergence of Learning Alliances as an approach to programme management in the WASH sector is a relatively recent phenomenon. The earliest examples of it being used in the development world are traced to an agro-enterprise project managed by a Columbia-based research organisation called Centro International de Agricultura Tropical (Lundy and Gottret, 2007). However, (Smits et al. 2007) also note how a project looking to transfer multiple-stage filtration water treatment technology to Columbian communities (the TRANSCOL project) exhibited many of the characteristics of Learning Alliances and took place between 1989 and 1996 (Smits et al. 2007; Visscher et al. 2007).

Recently, interest in Learning Alliance has been building within the WASH Sector, with a number of projects adopting the approach e.g. EMPOWERS, SWITCH, WASHCost, WASPA (for review: see Smits et al. 2007 and Verhagen, Butterworth and Morris, 2008). Despite the growing interest, the use of Learning Alliances is still in its relative infancy. As such, there is a limited pool of literature to inform its practice and analysis. Much of the literature is very practical in its approach and outlines the structural and methodological processes of the Learning Alliances. The theoretical concepts behind the approach are still relatively underdeveloped and draw from several different fields of the social sciences, such as social learning, innovation systems and action research. These concepts in turn draw from many other fields and are themselves in a process of evolution (Pahl-Wostl, 2002). Thus far, the Learning Alliance literature generally takes the form of commentaries provided by facilitating or management organisations involved in Learning Alliance projects. In these examples, the perspectives of different stakeholders taking part in Learning Alliances are rarely portrayed.

The following section of the literature review consolidates the current Learning Alliances literature and explains the structural and methodological elements of the approach. The next section provides an overview of the underlying concepts behind the approach, focusing particular attention on social learning and innovation systems and how they provide the rationale behind the methodologies used in Learning Alliances. Finally, the literature review provides a critique highlighting the deficiencies in current Learning Alliance literature.

2.2 Overview of the Learning Alliance approach

Learning Alliances can be thought of as providing a structural and methodological framework for engaging different stakeholders within a sector in order to optimise the prospects of "scaling up" appropriate innovations and embedding them within sector practices and procedures. Smits et al. (2007) provide the following definition for Learning Alliances which has been adapted to the context of the WASH sector:

"A series of interconnected multi-stakeholder platforms at different institutional levels (national, district, community etc.) aiming to speed up the process of identification, development and scaling up of innovations" (Smits et al. 2007)

In describing the concept behind Learning Alliances in the sector, Moriarty et al. (2005) draw attention to two key elements: innovation and scaling up. Innovation is described as "the development of locally relevant and appropriate innovative improvements in WASH service delivery" (Smits et al. 2007). Innovation includes not only the introduction of new types of technology or practices in service delivery, but also includes the application of existing approaches to situations in which they have not been applied previously (Rogers, 1995). Scaling up refers to both the institutionalisation of innovation through adoption by stakeholders at each institutional level, and the geographical spread of innovation to different populations and communities (Smits et al. 2007).

Smits et al. (2007) provide three defining characteristics of Learning Alliances as they are applied to the WASH sector. Firstly, the approach involves working at multiple institutional levels. With reference to the multiple institutional levels, Smits et al. (2007) provide the examples of community, intermediate and national institutional levels (Figure. 1). Community level describes the beneficiary communities being served. The national institutional level is comprised of organisations such as: national government, International Non-Governmental Organisations (INGOs) national NGOs, Utility companies, donor organisations and research institutes. Intermediate level describes the level between national government and the communities and may include: local government, NGOs, research institutes and private sector organisations.

Secondly, Learning Alliances involve multiple stakeholders from different disciplines (Smits et al. 2007). This is because providing WASH services to communities relies on a wide array of disciplines each with different responsibilities, mandates and skills. Multidisciplinary interaction is a key concept derived from social learning in natural resource management and represents a significant shift away from the old

technocratic paradigm of service delivery.

Finally, Learning Alliances use facilitated interconnected platforms operating at different institutional levels. Stakeholders from a multitude of disciplines are unlikely to come together of their own accord; they therefore require a platform around which to assemble to discuss the problem at hand (Smits et al. 2007). Platforms are organised spaces for social interaction among stakeholders, in order to make decisions around solutions to problems of service delivery. Facilitation is required to identify or establish such platforms for interaction and help to form synergies between the various stakeholders involved. Further, in such a multidisciplinary environment, there will invariably be conflicting interests and certain powerful stakeholders may prevent other voices from being heard. Facilitation is therefore needed to help platforms to come to an agreed course of action and drive the learning process forward (Smits et al. 2007; Röling, 2002). In a Learning Alliance, the role of facilitator is often undertaken by a research organisation with expertise in conducting multiparty research.

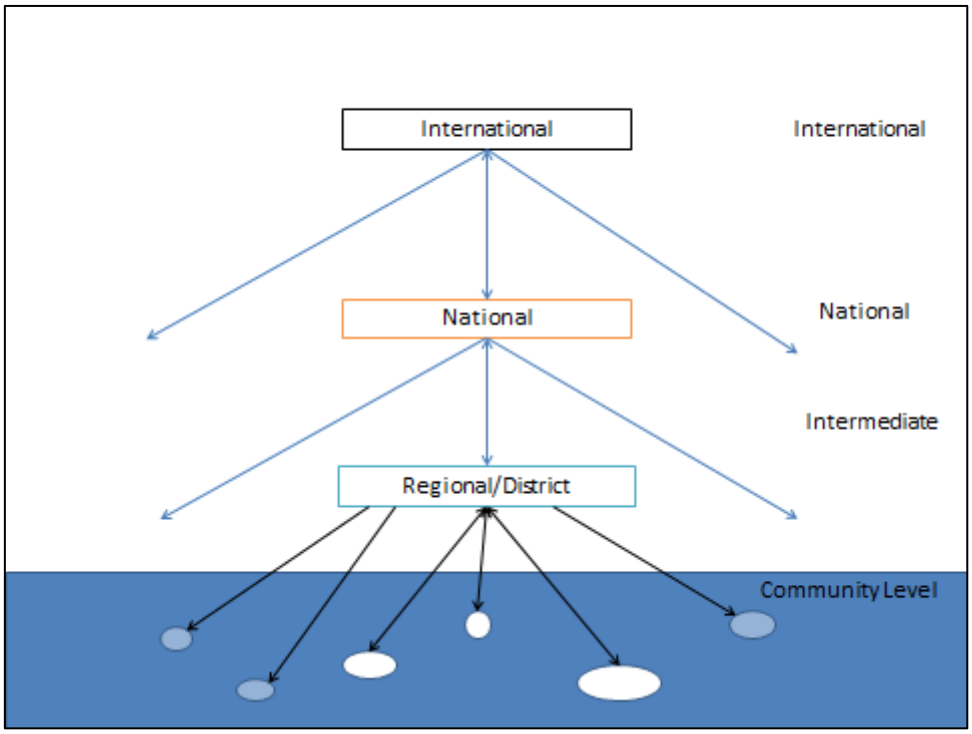


Figure 1: schematic of learning alliances; adapted from Smits et al. (2007)

2.3 Methodological approaches in Learning Alliances

There are no strict requisites for the methodologies to be applied in Learning Alliances. However, common components of most Learning Alliances include action research, process monitoring and documentation, and dissemination and communication (Smits et al. 2007).

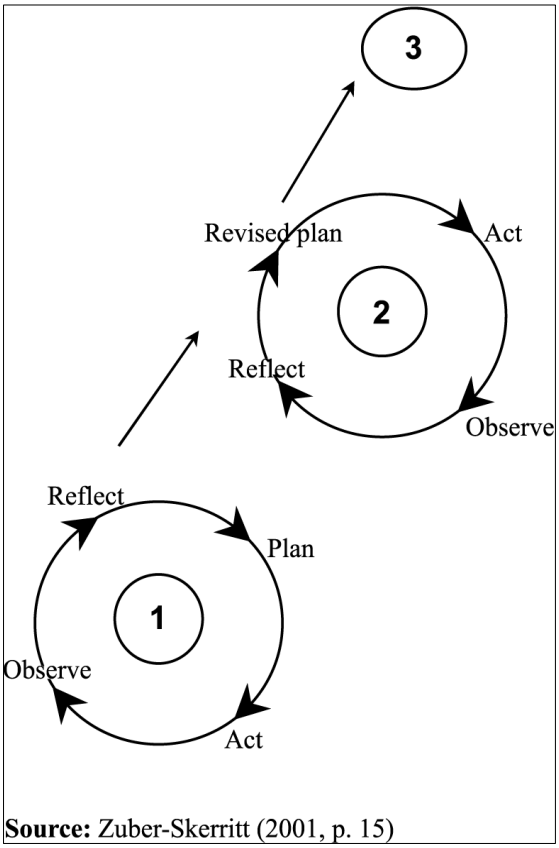
Action research

Action research may be the single most important methodological approach employed in Learning Alliances as its application is usually the source for identifying, developing and adapting innovation (Smits et al. 2007). The origins of action research are diverse (for review see; Fals Borda, 2001) and the discipline has been applied to a wide variety of fields. Action research is not a singular methodology but rather a diverse group of different approaches, which share common methodological, epistemological and philosophical ideals. A comprehensive review of the subject is therefore beyond the scope of this Thesis. Nonetheless, it is important to grasp the main concepts.

Action research is grounded in the values of the researcher and the participants of the research and has as a common philosophical underpinning: the objective of creating a fairer and more just society. As such, the approach is often considered to be inherently subjective and many action researchers reject the positivist notion of objectivity as it is applied to the social sciences, suggesting instead that all research takes place within a wider, value-based system (Brydon-Miller et al., 2003). However, others take a less radical approach and believe interpretive and positivist means of knowledge generation can be complementary (Popplewell and Hayman, 2012). In fact, it is not unusual for positivist methodologies to be used alongside participatory approaches in action research.

A defining feature of knowledge generation in action research is that it is participatory and democratic in nature. As Greenwood and Levin (1998) explain, action research usually involves a trained facilitator who aids a group of interested stakeholders to analyse a problem or opportunity and then generate solutions with the potential to transform their situation. The knowledge or theory developed in this process is then tested or acted upon to change the situation of the stakeholders concerned (Greenwood and Levin; 1998). Thus, action is a core element of the approach and the ultimate goal of the research is to bring about change, which will improve the situation of the community, organisation or sector involved.

The process of action research is often conceptualised as taking place in action research cycles (Figure 2.). Action research cycles break the process down into a three or sometimes four step process. In a three step cycle, the first step is to plan action, the second to take action and the third to evaluate the action before the next phase is started. In the four step cycle proposed by Coghlan and Brannick (2010), there is an initial pre-step where the context and purpose of the research is established before the additional step of constructing the issue is undertaken to begin the usual cycle of planning, action and evaluation.



Source: Zuber-Skerritt (2001, p. 15)

Figure 2*: action research cycles*

The use of action research is thought to help contextualise the learning agenda undertaken by a Learning Alliance, as the owners of the research problem (the Learning Alliance members) usually define the problem themselves (Smits et al. 2007; Proost and Leeuwis, 2007). Further, over the different cycles of research, participants are able to improve and adapt solutions. Lundy and Gottret (2007) suggest a system of "double loop learning" is crucial in ensuring ineffective approaches are not repeated. Double loop learning processes require a Learning Alliance to periodically reflect on whether the alliance is moving in the right direction as well as consider what is required to address the problem.

Process monitoring and documentation

Due to the fact that Learning Alliances strive to bring about changes to practice and policy within the sector, it is also important to understand the processes behind these changes: how they have come about and which factors have assisted or hindered them. Process monitoring and documentation is the means by which this is achieved. By tracking the outcomes and analysing the factors involved in the change process, a Learning Alliance is provided with the opportunity to put in place strategies to facilitate the scaling up process. Guijt and Proost (2002) also suggest this can encourage Learning Alliance members to reflect on the progress made and help to identify new strategies and opportunities.

Dissemination and communication

Dissemination and communication play a part in the scaling up process in the sector by stimulating innovation and increasing the awareness of it. Moriarty et al. (2005) explain some requirements for dissemination and communication in Learning Alliances. They suggest Learning Alliances should strive for short cycles of dissemination which are in time with the action research cycles. Findings from the research should be made available quickly even if they are not complete, which helps to keep information relevant and sustain the interest of stakeholders taking part in the process. It is also important to use media appropriate to the local context (Lundy and Gottret, 2007). Dissemination should be used for advocacy purposes and should not be limited to Learning Alliance members but include all interested stakeholders. Finally, there should be sufficient time and resources allocated to dissemination activities.

2.4 Conceptual review of WASH sector Learning Alliances

The Learning Alliance approach has derived its theoretical underpinnings from the two closely related concepts of social learning and innovation systems (Proost and Leeuwis 2007; Lundy and Gottret, 2007). At the heart of both of these concepts, are the notions of learning in a network of stakeholders or agencies, the reflexive nature of learning in this context and the development of new information or knowledge. Additionally, both social learning and innovation systems concepts assign a key importance to the institutional and social context in which the processes of learning occur.

Social learning

Social learning has been gaining increasing attention in the fields of development and resource management in recent years (Pahl-Wostl, 2002). Academicians and practitioners in the natural resource management world have adopted the social learning concept as an important method of developing solutions to complex problems which have a high degree of uncertainty and in which many different stakeholders are implicated (Pahl-Wostl 2007a; Röling 2002). Social learning was originally a psychological concept, which explained the acquisition of learnt behaviour through observing the actions of others (Bandura, 1977). Initially it focused on individual cognition; however, it has since developed to consider collective cognitive processes, which can lead to concerted action (Röling, 2002). Röling (2002) suggests that social learning is the process of moving from multiple to collective or distributed cognition. Multiple-cognition describes the scenario where multiple cognitive agents exist, each with their own perspectives on a problem. These agents may come together through interaction over a common resource (or in the example of WASH learning alliances, it may be a common problem in service delivery) and this may in turn develop into an agreement as to how to proceed, thus learning to act as a single cognitive agent capable of concerted action (Röling, 2002). The social learning concept therefore seeks to understand the participatory processes behind social change and transformation (Pahl-Wostl, 1995).

Pahl-Wostl et al. (2007) develop the social learning concept in the context of water resource management. Their interpretation of how social learning theory is translated into praxis bears particular relevance to the Learning Alliance approach currently applied in WASH project implementation. Acknowledging the contributions of Communities of Practice (Wenger, 1998), Pahl-Wostl et al. (2007a) take multiparty processes, where different stakeholders interact on a regular basis, as a core practical element in social learning. The engagement of multiparty stakeholder groups in "relational practices" such as common training sessions or joint field visits is viewed as a key mechanism in knowledge generation (Pahl-Wostl et al. 2007a). It is thought that by engaging in such activities, tacit knowledge can be shared, which is considered an important contributor to innovation (Nonaka and Taceuchi 1995).

In a similar vein, Röling (2002) observe how taking a social learning approach to the management of resource dilemmas has led to the use of platforms which are used to negotiate sustainable solutions. Platforms are defined as "contrived situations in which a set of more or less interdependent stakeholders in some resources are identified

and, usually through representatives, invited to meet and interact in a forum for conflict resolution, negotiation, social learning and collective decision making towards concerted action" (Röling, 2002).

The assumed outcomes of using multi-stakeholder processes of decision making are described on two levels. The first relates to the implementation of innovative measures to deal with the problem concerned. The second assumes capacity will be developed in the stakeholder group to manage problems (Pahl-Wostl et al. 2007a). The assumption made in the social learning literature is that multiparty processes lead to outcomes that are highly effective and of better technical quality, whilst at the same time developing relations which can increase the capacity of stakeholders to manage problems through development of social capital. Röling (2002), suggests the decision making process is strengthened through the diverse range of perspectives and experiences that different stakeholders bring to the platform. In addition, involvement by stakeholders in the decision making process is thought to help build ownership of the decision, lead to a greater willingness to reach an agreement and enhance commitment to the implementation of the agreed action (Joss and Brownlea, 1999; Pahl-Wostl et al. 2002b; Pahl-Wostl et al. 2007c).

The concept of social learning also recognises that these processes occur within a social and institutional context. Pahl-Wostl et al. (2007a) describe institutions as the formal and informal rules that govern the behaviour of human beings. Institutions can therefore affect the way in which learning takes place in multi-stakeholder platforms. However, these institutions may also change as stakeholders participating in multiparty processes gain new knowledge and experiences and share them with their respective constituencies. Lindner (2003) argues that this suggests institutional change derives predominantly from alternative practice rather than from the implementation of new formal rules or the deliberate choice of new structures of governance.

Innovations systems

The concept of innovation systems is based on the recognition that innovation, defined as "the production, diffusion and use of new knowledge of socio economic significance" (Hall et al. 2004), is not a linear process where research and development organisations simply produce innovations to be used by passive users. Instead, innovation takes place through interaction and knowledge flows between research and other organisations or agencies in both the public and private sectors (Hall et al. 2004). In other words, innovatory processes take place within a complex system of innovation involving many different agencies which include, for example, research institutes,

NGOs, government organisation and the users of the innovation themselves.

The concept of systems of innovation, whereby networks of different actors produce and share new and old knowledge was developed by Freeman (1987) and Lundvall (1992) in their work on national systems of innovations. Lundvall (1992) assigns a critical role to the sharing of knowledge or learning between different actors in a system of innovation and also emphasises the importance of the institutional context in which this diffusion of innovation takes place.

Hall et al. (2004) therefore divide the innovation systems concepts into two broad elements: 1) the network of agencies involved in the generation, diffusion, adaption and use of knowledge and 2) the institutional context which determines the way in which these processes are carried out (i.e. the behavioural norms and conventions dictating the actions of those operating within the system as well as the more formalised institutional factors such as legislation). This interpretation of innovation processes recognises the significance of developing relationships, synergies, alliances etc. in the diffusion of information (Hall et al. 2004). The concept also utilises the ideas that innovation is an inherently social process involving the social learning concepts of learning by doing (Chang and Chen, 2004).

Perceived benefits of the Learning Alliance approach

Some suggestions as to the perceived benefits for adopting the Learning Alliance approach to programme management are outlined in the Learning Alliance literature. Most of the benefits derive from the social learning and innovation systems concepts outlined above. The expected benefits are summarised as “the institutionalisation of innovations and their adaptation and replication to new context” (Smits et al 2007). Smits et al. (2007) also explain how scaling up is not always immediately visible, particularly as innovations require adaptation to the local context. Three intermediate outcomes are therefore proposed:

- First, it is thought that more effective and locally relevant innovations will be developed. The improved efficacy of innovation is derived from the assumed benefits of multiparty decision processes highlighted in the social learning literature above. However, Smits et al. (2007) also point to the involvement of the intermediate institutional level in learning alliances and the crucial role organisations at this level play in the sustainability of WASH interventions (Schouten and Moriarty, 2002).

- Second, in recognising the adaptation to local context as a pre-requisite to scaling up, it is proposed that the principles of an intervention may be scaled, rather than the actual intervention itself.

- Third, by engaging different stakeholders at different institutional levels, capacity is thought to be developed in the use of an innovation along with the ability to further adapt and reproduce it in different contexts (Smits et al 2007).

Smits et al. (2007) further deconstruct the concept of capacity into three identifiable levels: the individual level, the organisational level and the institutional level. Individuals learn through engaging in project activities such as problem analysis and action research. Individual capacity may be developed through the acquisition of knowledge, skills and motivation (Smits et al. 2007). However, it also includes the development of networks through engagement in multi-stakeholder learning processes. At the organisational level, it is assumed that organisations will adapt their working practices to accommodate and sustain the innovation by involving themselves in Learning Alliances. However, this is, as Sijbesma et al. (2007) identify, likely to be somewhat dependent on the ability of individuals to institutionalise new innovative practices developed in Learning Alliance activities within their respective organisations.

Capacity is also expected to be built at an institutional level and in many circumstances this may be the most important type of capacity, particularly where the area of service delivery being addressed requires a sector wide adoption to an innovation. Through the creation of platforms for different organisations to come together and exchange ideas, it is suggested that relations will be built or strengthened between these organisations. Sijbesma et al. (2007) argue that improved organisational relations mainly evolve through the mutual benefits realised through improved sharing of information and the negotiation of joint activities. Smits et al. (2007) suggest additional benefits of accountability, coordination and cooperation may also be observed.

2.5 Critique of the Learning Alliance Literature

As the Learning Alliance approach is still in its nascence in the context of the WASH sector, much of the theory behind the approach is relatively undeveloped. As Sijbesma et al. (2007) note, it is not yet clear how many of the proposed benefits are realised in practice. Thus far, the discussion provided in the Learning Alliance literature focuses on the process of innovation and creating the enabling environment to scale up

innovation by engaging a variety of different actors operating at different institutional levels. The assumption is that by promoting the development of new approaches to service delivery in this manner, institutionalisation and scale up will follow. However, the literature falls short of making the mechanisms behind the institutionalisation process explicit.

The current Learning Alliance literature places a great emphasis on the role of organisations operating at the intermediate institutional level in sustaining service delivery interventions. This is understandable, as this is where much of the service authority and supporting organisations are placed (Schouten and Moriarty 2002; Lockwood and Smits 2011). However, the role of national level stakeholders and how they support, in particular, the institutionalisation process, but also the diffusion of innovation within the sector is largely overlooked. Lockwood and Smits (2011) explain how in many developing countries the process of decentralisation is incomplete. As such, devolution of funding and service authority has not actually materialised in practice and these intermediate organisations are lacking the capacity to implement changes. Moreover, in many developing countries there is a shift towards using sector-wide regulatory frameworks and basket funding mechanisms in a bid to increase coordination of service delivery (Visscher et al. 2007; Lockwood and Smits 2011). This highlights the importance of understanding the role of national level organisations in the adoption of new innovations in service delivery within the sector. There is currently a deficiency in the literature around the ways Learning Alliance platforms at the national level can create a favourable policy environment for the implementation of the innovations which they generate (Sijbesma et al. 2007, Visscher et al. 2007).

There is a further oversight in the current literature: how innovatory processes developed in a Learning Alliance translate into the implementation of new practices in service delivery. Although the multi-layered structure of WASH Learning Alliances is assumed to build capacity at each institutional level, they often only engage a relatively small subsection of the stakeholders involved in its eventual implementation. As discussed above, the social learning literature proposes that this may occur through a passive process, whereby representatives involved in platforms of interaction develop new practices which are then taken up within their respective constituencies (Pahl-Wostl et al. 2007). However, there is currently little evidence in the context of the WASH sector to substantiate such claims and further research is required in order to provide insight into the mechanisms behind this process and ways in which it can be facilitated. Moreover, in the context of a fragmented sector where many independent stakeholders operate at each institutional level, it is unlikely a Learning Alliance will be able to engage all stakeholders in the area of service delivery concerned.

Communication and dissemination practices are seen as amelioration to this problem. However, once again this presupposes a context of a cohesive sector where practices are communicated freely. The reality is that many sectors are indeed fragmented with little communication between different areas of the sector. Sijbesma et al. (2007) note a chicken and egg situation, where the Learning Alliance approach demands good coordination between sector agencies, but multi-stakeholder interaction is required to create this environment. However, this implies certain sound innovations in service delivery created through multiparty processes, will be sacrificed for the sake of creating this enabling environment for sector learning.

It is clear further research is needed to investigate the processes behind institutionalisation of innovations in the context of WASH sector Learning Alliances. A greater understanding of how innovation is diffused and converted into practice is another area which needs to be investigated in this context.

3. WASHTech Project overview

Between January 2011 and December 2013, the Water, Sanitation and Hygiene Technologies (WASHTech) project conducted an action research project, which attempted to build capacity in technology assessment and introduction in the sector in three countries; Burkina Faso, Ghana and Uganda. The overall development objectives of the project were to strengthen WASH sector capacity to make effective investment in new technologies, thereby improving sustainability of WASH services and ensuring that the scale-up of suitable technologies is realised. The project intended to achieve this objective through action research in the development of tools, which could be used by the sector in the assessment and introduction of technologies. The project was concerned with technologies operating at a decentralised level, rather than technologies involved in large scale water or sewage networks for example.

WASHTech was funded by the European Commission seventh framework programme and had a relatively modest budget of 1.6 million Euros. Although a small project in budgetary terms, it was relatively large from an organisational perspective, comprising a consortium of eight development partners from Africa and Europe and involving action research in all three countries. The consortium was made up of implementing NGOs, resource centres and research institutes. European consortium partners included; IRC international water and sanitation centre (IRC), Cranfield University, the Swiss Centre for Appropriate Technology (SKAT foundation) and Water Aid UK. The African consortium partners included: Water Aid – Burkina Faso and Water and Sanitation Africa (WSA) in Burkina Faso; Training, Water Aid – Ghana, Training

Research and Networking for Development (TREND) and Kwame Nkrumah University of Science and Technology (KNUST) in Ghana; and Water Aid - Uganda and Network for Water and Sanitation (NETWAS) in Uganda. IRC were the project managers and were responsible for coordinating different components of the project, delegated to consortium partners through work packages. The main focus of the project was within the three participant countries (Burkina Faso, Ghana and Uganda). European consortium members, Cranfield University, Skat Foundation and Water Aid UK were responsible for supporting the production of various project outputs by consortium partners operating in each country.

The WASHTech project also had a strategic aim to scale up their service delivery innovations to other developing country contexts. Therefore, there was a concerted effort to share their research over the internet and through presentations at various international WASH sector events. IRC established a website where consortium partners could share their progress and the project outputs, which they had developed. The SKAT foundation also developed an open access website, which would eventually host the final tools developed during the project and enable stakeholders to use the tools and post their findings free of charge. Consortium partners were also encouraged to attend international sector events and present the project innovations. Partners also drew from their existing networks to disseminate project innovation. It is important to note however that this research focuses on Learning Alliances operating at the national level rather than the international level.

WASHTech project innovation

In order to fully comprehend this research, it is important to understand the rationale behind the WASHTech project addressing technology assessment and introduction as an area of service delivery. WASH technology in the sub-Saharan African region has a history of poor performance. To provide a clear example, breakdown figures show that 30-40% of decentralised water systems are non-functional at any one time, a statistic which has hardly changed over the last two decades (Evans 1993; RWSN 2009; Lockwood and Smits 2011). This represents a huge waste of resources and, most importantly, an interruption in services for communities, with obvious implications for the health and social wellbeing of those concerned. Many complex issues contribute to this situation, however, one factor which can be identified as a potential major contributor relates to the very first steps in providing WASH services. In many countries in sub-Saharan Africa, there is an absence of clear assessment and introductory procedures for WASH technologies. The various consequences of this can be summarised as follows:

- Lack of coordination between implementing agencies resulting in the introduction of many different versions of similar technologies and unsustainable supply chains for spare parts
- Powerful donors dictating the selection of technologies
- Introduction of technologies which look good on paper but fail to deliver on the ground
- Introduction of technologies which are unaffordable for the intended users
- Introduction of technologies which cannot be supported in the local context – e.g. no local expertise for maintenance.
- Rejection of good technologies
- Aggressive promotion of technologies which are not appropriate
- Government organisations and/or support agencies becoming overwhelmed with technologies in early stages of development
- Lack of post-implementation monitoring of technologies so problems are not identified and addressed
- Technologies get stuck in a perpetual piloting phase without being adopted into sector strategies or scaled up for wider use in the sector

The WASHTech project intended to overcome these issues through the development of tools that can be used to assess technologies and aid the introduction of appropriate WASH technologies. The main tool that was developed during the project was the Technology Applicability Framework (TAF) tool. The development of this tool accounted for the majority of action research activities taking place within the Learning Alliances. The tool was a framework used to assess the applicability of a technology to the local context (for a detailed overview see Kimera et al. 2013). The TAF tool requires the collection of field data around six different sustainability dimensions (Figure.3).

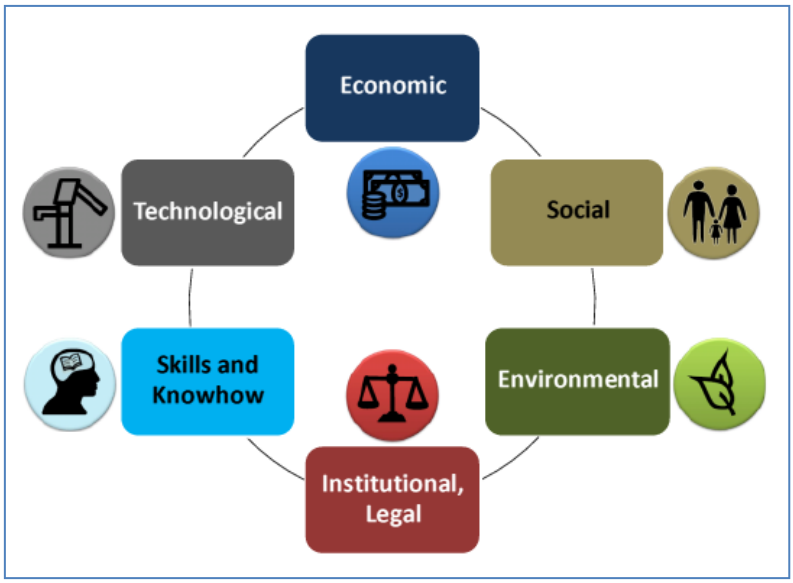


***Figure 3**. Sustainability dimensions used by the Technology Applicability Framework (source: www.washtechnologies.net)*

In employing the TAF tool a field team of researchers and facilitators are assembled for the purpose of data collection. The field teams conduct surveys with questions relating to the sustainability dimensions identified above. Data collection explicitly seeks the perspectives of three main groups of actors: the users of the technology, the producers or providers of the technology and the regulators of the sector (Kimera et al. 2013). Additional documentary evidence relating to the technology to the technology being assessed is also collected. Once the field team has collated the data, a meeting is assembled comprising stakeholders from different disciplines usually operating at the intermediate and community levels. These stakeholders discuss the performance of the technology in the six sustainability dimensions. With the help of a facilitator, the group must come to an agreement on a score to attribute to the technology within each dimension (Figure 4). In the context of the WASHTech project, the findings from the scoring workshops were presented as technology recommendations for the sector, presenting each technology as an individual case study.

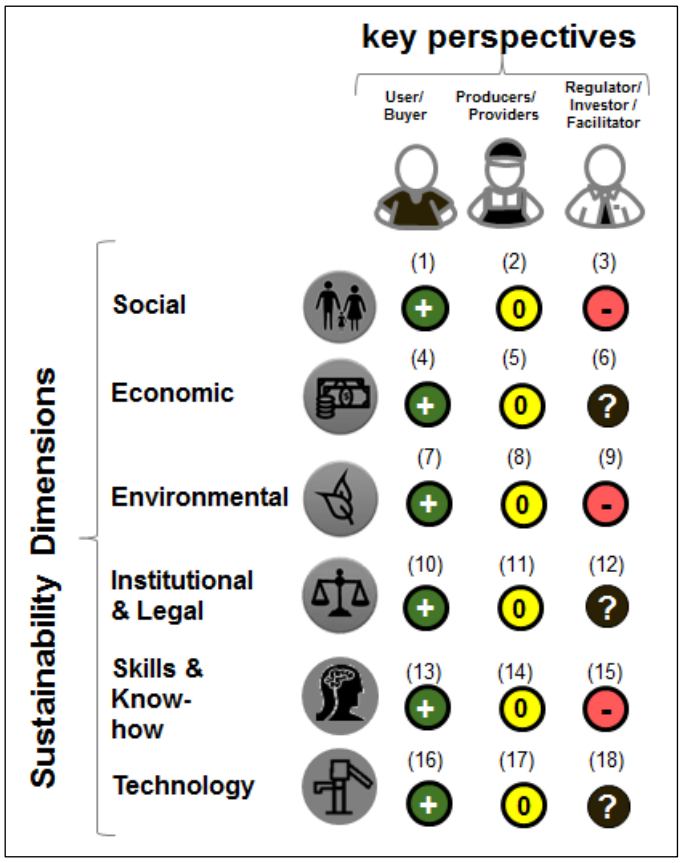


Figure 4. *Example of scoring produced for a WASHTech technology assessment. (source: www.washtechnologies.net)*

The other tool the project developed is the technology introduction process (TIP), which seeks to guide the processes of introducing and scaling up technologies (Kimera at al. 2013). The tool aims to break down the different stages of technology introduction, scale up and make the roles and responsibilities of the stakeholders involved in each step explicit. This tool did not involve as much participatory development as the TAF. It was predominantly developed by the SKAT foundation and then modified in collaboration with government representatives in each country.

Learning alliances in WASHTech

A schematic outlining the structure of the Learning Alliance in WASHTech is presented in figure 5. The WASHTech consortium outlined above formed a platform operating at an international level. The consortium met on six different occasions during the course of the three year project timeline. Two meetings were held in Uganda and one meeting was held in Burkina Faso, Ghana, the Netherlands and the UK. These meetings provided the opportunity for consortium members to; update each other on their relative progress on project outputs, report any problems with programme

implementation, share findings from action research and evaluate their strategies for embedding and scaling up their innovations. In addition, monthly manager meetings took place, where the leaders of each project component shared updates about the progress of the project over the internet.

At the national level, consortium members from African organisations in charge of programme facilitation were responsible for the formation of national Learning Alliances. These organisations formed core working groups of key stakeholders operating at the national level. Core working groups generally consisted of representatives from government ministries, national utility companies, NGOs, research institutes and private sector organisations. Facilitating organisations made use of existing sector platforms, including platforms previously established by IRC, in order to recruit stakeholders for involvement in core working groups.

Action research activities generally took place with stakeholders at the intermediate and community levels. These activities involved application of the TAF tool to different technologies being used in each country (table 1) using the processes outlined above (see *WASHTech project innovations*). Field teams were trained to apply the tools and collect data on technology performance from communities. Ad hoc multidisciplinary stakeholder platforms were set up in the area in which the technology assessments were taking place. These platforms involved representatives from local government, municipal utilities, NGOs, research organisations and local communities. On certain occasions, core working group members from the national level attended these scoring workshops.

Information about technology performance and the performance of the TAF tool was fed back to core working group members after the scoring workshops took place. Consortium members reported this feedback to the rest of the consortium particularly the SKAT foundation who was the consortium member responsible for designing and modifying the tools.

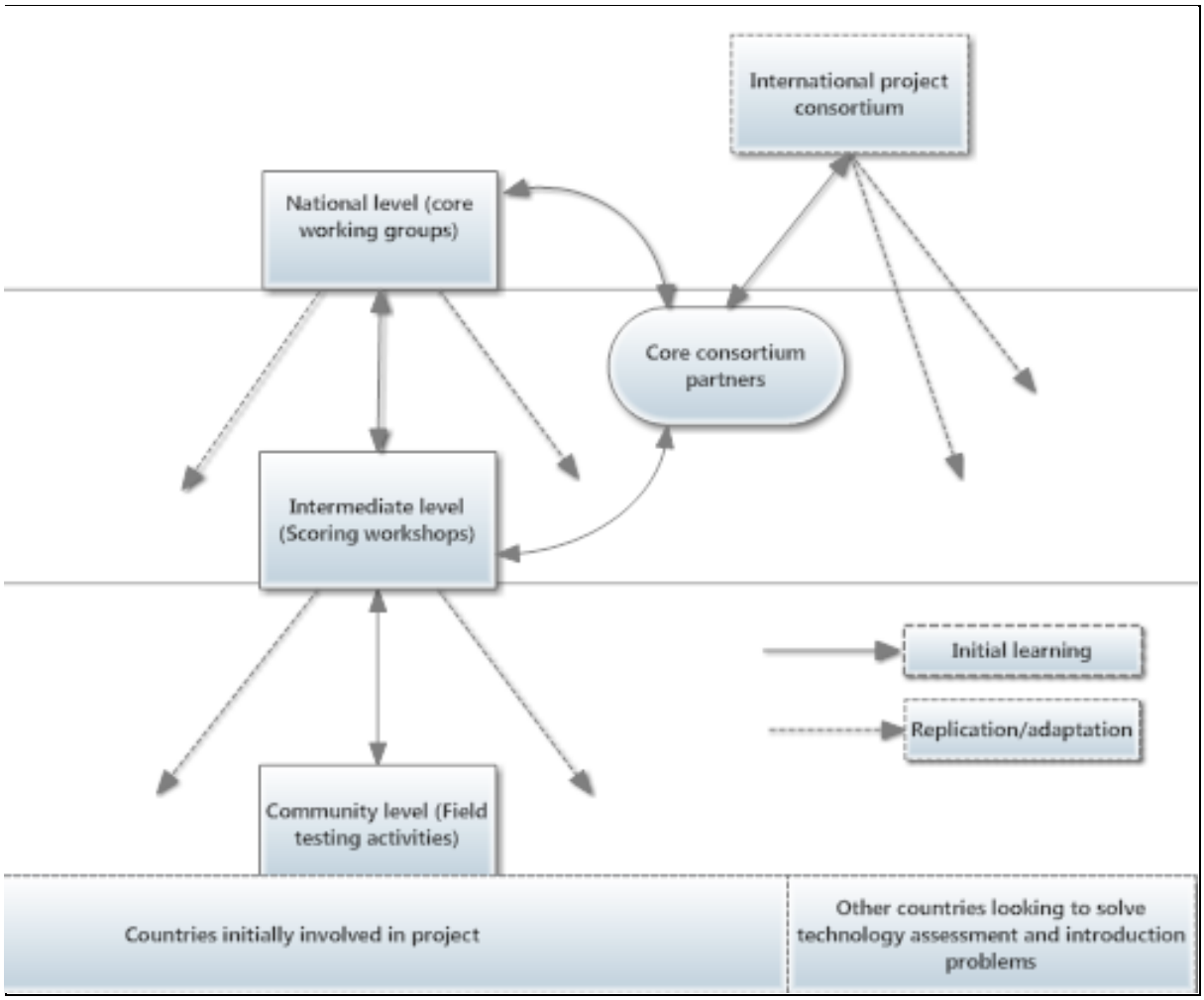


Figure.5 Structure of the WASHTech Learning Alliance

Phases of implementation

The WASHTech project took place in three identifiable stages of implementation which broadly corresponded to the years in which the project was running.

Phase 1: situational analysis/ problem identification/tool development

In the first year of the project, facilitating organisations in each country conducted a review of the technologies which were being used within their sector, looking at cases of different technologies which had experienced varying levels of success (Trawick and Parker, 2012). These organisations conducted a further baseline study, which sought to establish the knowledge, attitudes and practices around technology assessment and introduction in each country, as well as the requirements for tools to be used for this purpose (Parker, 2012). The SKAT foundation conducted a review of the tools which had previously been developed for the purposes of technology assessment and

introduction. This review, along with the feedback of requirements for the tool was used to inform the production of the first draft of the TAF. National level core working groups were engaged throughout the country level situational analysis studies. The core working groups were also asked to select six technologies of interest, which would be tested during the subsequent development of the TAF (Table 1.).

Table 1. *Technologies assessed during tool development by country*

Country	**Technology assessed**
Burkina Faso	Rope pump VIP latrine India Mark II Urine Diverting Dry Toilet (UDDT) Sand Damn Water Harvesting Tank
Ghana	Rope pump Poor flush Enviroloo Ghana modified India Mark II Biofil Toilet Slow Sand Filter
Uganda	Rope pump Urine Diverting Dry Toilet (UDDT) Solar Water Pump U2 Pump Ferro Cement Tank Tippy Tap

Phase 2: Research

During the second year of the project, the majority of action research around tool development took place. Water aid-UK developed a study design for the testing of the tools on the technologies selected during the situational analysis. Multi-disciplinary country field teams were trained in the use of the tools and in facilitation of scoring workshops. The tools underwent three rounds of testing in each country by applying them to the six technologies in different regions. After each round of testing the SKAT foundation generated an updated version of the tool, taking into consideration the feedback from testing.

Phase 3: Dissemination, embedding and advocacy

The final year of the project focused on disseminating the results of the research throughout the sector and embedding the tools in selected institutions. Core working groups gave their final input into the tools and consortium partners were asked to

produce technology recommendations for the sector, drawing from the findings of the TAF testing. The facilitating organisations identified host organisations which would have responsibility for the tools when the project came to an end. Key government organisations were also engaged in the development of country specific guidelines for technology introduction (TIP). Further dissemination activities were organised for the final year of the project in an attempt to raise awareness of the tools in the participant countries and also globally. This dissemination work included activities such as interactive webinars and presentations at various national and international sector events. It is important to note, however, that dissemination work took place throughout the projects timeline.

4. Methodology

Study design and concept

This qualitative study adopts a realist evaluation approach to the investigation of the WASHTech Learning Alliances (Pawson and Tiley, 1997; Pawson, 2006). Within the context of programme evaluation, realist evaluations are increasingly seen as an adjunct to experimental designs, particularly in the evaluation of complex interventions addressing issues such as governance and capacity building (Holma and Kontinen, 2011). In such interventions, it is often difficult to define clearly measurable indicators for the realisation of project outcomes. Moreover, it is argued that the emphasis on producing indicators that can be easily measured is at odds with a learning agenda which is obviously important in the improvement of development interventions (Holma and Kontinen, 2011). Experimental designs can demonstrate whether or not an intervention has had an impact but are often unable to reveal how an intervention has brought about change and the contextual conditions necessary for an intervention to be successful. Realist evaluation acknowledges the wider context in which an intervention takes place, taking account of issues such as: availability of human resource, the existing policies within a sector, and the programmatic factors involved in implementation. The mechanisms at work in an intervention, as well as the intended and unintended outcomes, are identified most commonly through qualitative enquiry of those involved in a change process. The realist approach recognises that interventions work in different ways under different circumstances. The aim of the realist approach is therefore to identify which mechanisms work, in which contexts, to produce which outcomes, or as Pawson and Tilley (1997) explain “What works, for whom, in what circumstances and how?” The study design was thought to be a suitable design for the WASHTech Learning Alliances for several reasons. Firstly, the WASHTech was taking place in three different countries each with different contextual factors at work. Secondly, the project was seen as relatively complex, engaging many

different stakeholders in a number of different interventions in a complex area of service delivery. Thirdly, there was a lack of clearly identifiable measurable outcomes.

A realist evaluation begins with theory building; a process whereby the researcher builds understanding around the interventions being implemented and how they are proposed to work. For this study, a comprehensive review of project documentation, including sources such as funding proposals, project monitoring documents and the projects theory of change, informed the initial identification of project interventions. A subsequent review of the literature surrounding the various interventions including that of: learning alliances, social learning, innovation systems, diffusion of innovations and participatory research was necessary to develop the theory behind the WASHTech project interventions. Context, mechanism, outcome, configurations were then developed as proposed scenarios for the way in which interventions will work (Pawson and Tilley 1997). This process informed the development of the interview questions used for the study. Questions were developed in conjunction with facilitating organisations in each country and underwent two rounds of drafting before finalisation.

Copies of the interview questions are provided in Appendix A. Although interviews differed slightly according to the respondent, they covered the same thematic areas summarised as follows:

1) Changes in policy, practice and procedure relating to technology assessment and introduction.
2) Changes in knowledge, attitudes towards technology and technology assessment procedures.
3) Control and coordination within the sector.
4) Perception of project innovations.
5) Level of institutionalisation realised by project innovations and suggested actions for future institutionalisation and scale up.

Sampling and data collection

The study adopted a purposive sampling strategy. Facilitating organisations were asked to generate a list of stakeholders involved in various project activities. Participants were selected on the basis that they had at least some experience of the WASHTech project, with an emphasis on obtaining the views of individuals experiencing different aspects of the project. The sample in each country included:

- Learning alliance members involved in core working groups operating at the

national level.

- Those involved in the field testing of technologies assessed by the project
- Technology developers and manufacturers that worked with the technologies being assessed.
- Participants of scoring workshops established to evaluate the performance of. the technologies tested during the project.
- Representatives from the organizations facilitating the project.

The sampling strategy also aimed to capture the views of representatives from different parts of the sector taking part in the Learning Alliance: As such, the sample included representatives from the following types of organisation:

- National Government (ministries and relevant directorates)
- Local Government (e.g. local Authorities, district offices attached to ministries)
- National water and sanitation utilities and their regional/municipal offices
- Non-Governmental Organisations
- Private sector organizations involved in WASH technology development and manufacture

Forty semi-structured key informant interviews (average duration 38 minutes) and one focus group discussion (1hr 15 minutes) were conducted over an eight week period in June and July of 2013. The focus group discussion was conducted in Burkina Faso among a group of fifteen employees that worked for the general directorate of water resources of the ministry of Ministry of Agriculture Water and Fisheries. Approximately two weeks were spent carrying-out interviews in each country. Prior to the start of the interview respondents were briefed about the purpose of the study and signed consent was obtained from all participants (see Appendix. B). Ethics approval was obtained from Cranfield University Science and Engineering Research Ethics Committee prior to initiation of data collection. Interviews were conducted by the researcher except for two interviews in Ghana, which were carried out by researchers from consortium partner organisation KNUST. Interviews taking place in Burkina Faso were conducted in French through an interpreter with the exception of three interviews, which were conducted in Mòoré and translated into English. It is important to note that interviews were carried out approximately 6 months prior to the end of the project. Thus, in many cases, the study cannot report concrete outcomes in terms of changes in policies, procedures and practices as these were yet to materialise at the time the interviews were taking place.

Supplementary data

The study made use of data generated from interviews conducted as part of the impact monitoring component of the project, which used the Most Significant Change (MSC) methodology (Davis and Dart, 2005). This entailed encouraging WASH stakeholders, to provide a short story about a change they had observed as a result of the project. Facilitating organisations in each country gathered stories from stakeholders who either had direct involvement in the Learning Alliances or who had encountered the project through the projects' dissemination activities. Thirty MSC stories were used from the participant countries however; the MSC stories were not subjected to the same rigorous coding and analysis procedures (described below) as key informant interviews and focus group discussions. Instead, the MSC stories were used as further validation of the findings from interviews as it became apparent the analysis had reached a point of saturation with regards to the findings being reported.

This research drew from various other forms of project documentation. Posts on the projects' website, as well as monthly project newsletters, which were circulated among consortium members by the IRC were used to identify project activities. This information was assimilated into a project timeline displaying when Learning Alliance activities took place in each country. This process aided the identification of programmatic factors such as when the learning alliance core working groups were formed and the number of meeting which took place throughout the course of the project. The research also utilised the baseline assessment report (Parker, 2012) as a reference for the policies, procedures and practices in each country at the start of the project.

Analysis

All interviews were recorded and transcribed verbatim. NVivo 10 was used for the purposes of data management and analysis. An initial list of codes corresponding to the context-mechanism-outcome configurations, developed during the theory building phase of the study, was generated. This list of codes was not exhaustive and was open to adaptation throughout the coding process. The lists of codes were entered into NVivo 10 as nodes and grouped into and grouped into five themes related to the interview question subject areas. A nodal Hierarchy was formed so that reported outcomes formed the main nodes, with mechanisms behind outcomes and important contextual information forming sub-nodes. Interview transcripts were subjected to several rounds of coding. In order to limit the bias introduced during coding, both affirmation and refutation of proposed outcomes and mechanisms were coded.

After transcripts had been coded, matrix frameworks were produced (Miles and Huberman, 1994). Columns were headed by reported mechanisms, outcomes and associated contextual information, whilst rows were headed by the respondents, identified by the organisation they represented. Initially raw text that had been coded under nodes and sub-nodes formed the cells of the framework matrices (Miles and Huberman 1994). Several phases of data reduction took place and raw text became abbreviated concepts. Throughout the entire coding and analysis procedure analytical memo writing took place, in order to capture important concepts as they emerged from the data.

The results generated by the analysis were cross-checked between the researcher and researchers in country partner organisations. Respondent validation was carried out by emailing participants and asking for clarification on any answers, which were not clear. A process of triangulation took place whereby reported outcomes, mechanisms and contextual factors were verified by other sources such as project documentation, project baseline reports, MSC stories and government and development partner reports. The MSC stories and baseline reports in particular were used to provide further contextual understanding of technology assessment and introduction in each country.

5. Results

A total of forty semi-structured key informant interviews took place as well as one focus group discussion (seventeen semi-structured interviews and one Focus Group Discussion in Burkina Faso, eleven semi-structured interviews in Ghana and eleven in Uganda). According to the different respondent categories, there were ten interviews with representatives from national government, two with national utility companies, eight with local government, two with regional municipal offices of utility companies, twelve with NGOs, six with private sector organisations, and one with a representative of a research organisation.

Appendix C. contains tables detailing the interviews that took place and provide, the organisations represented and their involvement in the WASHTech Learning Alliances. Any quotes associated with the reported outcomes and mechanisms of change are followed by a respondent identification.

5. 1 Capacity development in the Learning Alliances

5.1.1 Knowledge acquisition and attitude changes

Knowledge acquisition was a major area explored during semi-structured interviews. One of the main themes to emerge from the data was the acquisition of knowledge about technology performance within the sector with twenty-nine out of forty respondents reporting this outcome. Respondents identified specific issues related to technologies and various barriers to scaling them up, largely through the testing and scoring workshops. In several cases, examples were provided of how the groups involved in scoring workshops had been able to develop potential solutions to overcome barriers to scaling up.

> *"So they also eventually realised that there was a need to promote the technology. The technology seemed to be a costly one and they had to do some promotion to better market it - and this promotion was done by cutting down the cost for more people to be able to procure it." (BF/PS_2)*

Twenty-six respondents explained how the knowledge they had acquired about technology performance had led to changes in their attitude towards certain technologies. All those reporting these outcomes had either attended the scoring workshops or had been involved in the field testing. Analysis of the mechanisms behind knowledge acquisition and attitude change revealed that application of the tool, in either of these scenarios, provided understanding of the "field reality". The recognition of the technology user's perspective was frequently cited as an important contributor to this understanding.

In Burkina Faso, those taking part in the testing of the rope pump frequently reported that their attitude towards this technology had changed for the better:

> *"So the TAF also helped himself understand more, educate himself more because he had ideas about certain technologies, like the rope pump; he is giving the example of the rope pump; his first reaction was that it wouldn't work you know but when he did the testing he actually understood that he was wrong; the population accepted it and it worked." (BF/LG_1)*

> *"The rope pump is something that we identified as a good technology during*

this assessment because we used to have the big wells but they were not covered formally. So bringing the rope pump made people know that we can use the groundwater, but covering the well makes it safe. When the well is not covered it is not as safe. So this is a major observation which came over during the project implementation with our involvement." (BF/LG_2)

Respondents in Ghana also reported recognising a promising new sanitation technology through their engagement in scoring workshops. Learning Alliance members from four different organisations reported recognising this new technology and indicated that they had formed a consensus that this technology has the ability to be scaled up and used more widely within the sector.

"Through the WASHTech project, we have been able to identify a very good potential sanitation technology. That is the Biofil. Previously, it was seen as a private venture, but through the WASHtech [project], it was one of the technologies that we used to test TAF and I think the sector or the stakeholders involved now feel that it's one technology that can be taken through the process properly and therefore can be adopted in the sector." (G/NG_1)

"Testing the suitability of Biofil, the cost of Biofil, the user friendliness, how sustainable it is, whether there are spare parts in the system in case of breakdown, all these things were looked at. So it gave me a better understanding of the Biofil toilet and I recommended it for my organisation and indeed in some of the proposals that we have submitted for funding in the area of sanitation we added Biofil." (G/NGO_2)

In Uganda, respondents reported recognising specific issues with the UDDT (also known as Ecosan latrine) and suggested many problems identified could be overcome with adequate marketing and sensitization around the technology.

"Um probably more from the sanitation side; the Ecosan I think started with issues but I think it's one sanitation bit [technology] that can be promoted if a better understanding of how it works is put more clearly." (UG_NGO2)

5.1.2 Coordination amongst stakeholders in the sector

Coordination between different stakeholders involved in the Learning Alliances was another important theme emerging from the data. Private sector organisations in each

country provided examples of gaining awareness of the official bodies involved in technology assessment and introduction. Stakeholders from the private sector were put in touch with governmental bodies during the scoring workshops. Respondents from the private sector, as well as an NGO in Ghana, commented that interaction with government authorities had reinforced the need to engage with sector regulators when they are introducing a technology.

> *"So first of all, he for example came to know that in the process of scaling up technology or even introducing them, you need to liaise with the regional directorate of water and sanitation. The second thing, still related to that, is the way to do it, how to work in conjunction with the local authorities to be able to introduce new technologies."(BF/PS_1)*

> *"So for us, having been beneficiaries of the project, we will put in place measures to make sure that no such technology is introduced without passing through the formal assessment."(G/NGO_2)*

In Ghana, the involvement of a private technology developer in the multidisciplinary scoring workshops had allowed them to identify the relevant authorities involved in technology assessment and introduction. This company's sanitation technology had been identified as being a promising prospect for scale up within the sector. The company has now been engaging with the Environmental Health and Sanitation Directorate of the ministry of local government in order to have the technology officially assessed with a view to scaling up the technology for wider use within the sector.

Below, a representative from the company explains how their involvement in the project through engaging in multi-disciplinary scoring workshops has helped to clarify the processes of assessment and introduction:

> *"Because without the TAF you don't even know the framework for introducing your technology and so you have your idea but you don't even know where to start or who to go to for help and with the TAF, it brings all the stakeholders together, so you are able to know who to go to and for what. Especially for the ministry of local government, now we are in some form of negotiation with them to ensure that district assemblies are put on board with regards to decentralising our technology to homes and so in a way it has been helpful to us."(G/PS_1)*

The involvement of government authorities in scoring workshops had also allowed these stakeholders to take account of the frustrations of non-governmental actors around the lack of clear processes for technology assessment and introduction. These

realisations had created demand for formalised, documented and therefore more explicit processes in the sector.

> *"We were just in a meeting last month, at a national meeting and I mean the local participants that we invited, the private sector people we invited, I mean plenty said that it was so difficult to even let government people look at the technology. There weren't any written down processes, so whatever officer you meet will give you different instructions at different times. (G/NG_2)"*

> *"Regarding WASHtech, we may say that we have got a positive impact - during the evaluation of the products we realised that it is not always obvious, actors are not known, sometimes there is misinformation and sometimes the sender of the product does not know all the processes to approve the product." (BF/LG_2)*

In Burkina Faso and Uganda, the involvement of rope pump manufactures in field testing activities provided them with the opportunity to engage with the users of their technology. The rope pumps are usually installed by NGOs and this interaction had motivated them to have a greater level of involvement with the communities using their technologies. The rope pump manufacturer explained how they were now making efforts to ensure communities were able to contact them if they had operation and maintenance issues. The respondent representing the technology company in Uganda also mentioned that they had even trained some community members in operation and maintenance of a particular spare part. In Burkina Faso, one rope pump manufacturer suggested his attendance of multidisciplinary scoring workshops had been the motivating factor in improving community engagement.

> *"So at the beginning he was just manufacturing the pump for the communities but now when the project came he was invited several times to attend workshops and there were discussions and with the discussions, the kinds of questions people were asking, the kind of issues that were bought, he said OK, the thing is even more important than I had thought. So he said he needs to talk more to people to visit them more, to better understand if there are any difficulties at the community level. So like back and forth, he hears things during workshops and that sort encourages him to go back and talk to the communities." (BF/PS_1).*

The interviews in Burkina Faso also revealed that the testing and scoring workshops had bought rope pump manufacturers working in different parts of the country together. This had made them realise how they need to coordinate their work. Respondents from these organisations also reported that the scoring workshops had

provided the opportunity for them to improve the design of the pumps. With input from various stakeholders attending the scoring workshops they had developed a new design for the pump with an improved mechanism. With the newly designed pump water begins to emerge from the pump after a shorter time period than with previous designs.

> *"So it was a good opportunity for themselves because they are far away but because they were bought together to have a chance to meet and discuss and because they do same work, said ok why don't we try to take the initiative meet on our own discuss our internal problems." (BF/PS_1)*
>
> *"They were intending to really improve the design of the rope pump and he even requested water aid, namely [Facilitator], the one who was with us, to help them organise with all the actors to see how best to redesign the rope pump.*
>
> *Translator: he is showing the photo [of a new design for the rope pump]. This is another design of the rope pump."(BF/PS_2)*

5.2 Stakeholder perceptions of project innovations

All forty-one respondents were unanimous in their opinion that there was a need for a tool like the TAF in the sector. Key informants in each country believed that by applying a standardised methodology and criteria for assessment, the TAF had the ability to address many challenges relating to technology introduction. Respondents thought the tool would help make the process more explicit for non-governmental actors wishing to introduce technologies. They also thought that having standardised criteria would provide grounds for accepting or rejecting technologies and this would enable government organisations, rather than powerful non-state funded actors, to dictate the technologies being implemented.

> *"The TAF has come to help deepened our concerns that were raised in the past. That concern has been on the need for an assessment tool. The TAF has come to help resolve that short coming in our sector."[G/LG_1]*
>
> *"More often than not such technologies are accepted and piloted. In brief technology introduction has been donor driven. Prior to the introduction of the TAF there was no documented laid down assessment tool."[G/LG_2]*

"I have seen cases where technologies have been bought into the country introduced and then they become a disaster but now getting rid of it getting rid of them becomes a problem but this process that has been introduced by WASHTech will definitely help with making sure that whatever is being introduced is appropriate in the country."[UG/LG_3]

Respondents reported a process whereby tools were made more user-friendly throughout the course of action research activities. In particular, the Learning Alliance members' interaction with the users of technologies during the testing of the tools had allowed the members to adapt the questions in the TAF tool and make them more suitable for the intended audience. A frequent observation was that initially the data collection was very slow and some of the wording of the questions was difficult to understand but after several rounds of testing, the process became faster as questions were cut out and improved.

"At the beginning it was hard because some of the questions are really not easy to understand but then from criticism and feedback from different people, many questions were simplified, they were rephrased, reformulated and more you know easier to understand." (BF/LG1)

"Initially it was very confusing for me, the initial stages that I was involved, the framework seemed very complex. But I think after the first phase of testing, for which I went for the workshop, I think it has become simpler and clearer as to what it seeks to achieve and what's the processes." (G/NGO_3)

"So now I don't know if the tool has been approved for use because once approved we shall adopt because the ministry has been working hand in hand with the [project]…And we proposed the changes to be made to make it viable…so I think once the final tool is given to us we can be ready to use it."(UG/NG_1)

However, a common theme to emerge, particularly in Burkina Faso and Uganda, was that the TAF tool was still too complex at the time at which the interviews took place. Respondents reported that the tool was "heavy" or "bulky" and required questions to be removed or simplified. Many respondents felt there was a need for further adaptation before it could be scaled up in the sector and used by those actors who would ultimately be responsible for its use.

"Now I have already made some comment on the user friendly perspective regarding the TAF. Now one of them is that the document is bulky."

(Ug/NG_1)

"This is very manual, very bulky. So as a framework it is very good but it there is still a lot to do to make it generally applicable." (Ug/NG_2)

"Now there are too many questions, it is a bit bulky, so some of the ideas could have been aggregated." (BF/LG5)

Again, particularly in Burkina Faso and Uganda, respondents also had concerns about the actual implementation of the tool. The main concerns reported were costs associated with carrying out technology assessment in this manner. These respondents characterised cost in terms of; the economic costs, the human resources and the time associated with applying the tool. Taking these factors into consideration, respondents felt there may not be the capacity to implement these tools in the way they had been during the project, at the district level, which is where these procedures would need to be applied. In Burkina Faso, government stakeholders were also aware of the need for financial support around capacity building amongst intended users and were not sure where this money would come from. In Burkina Faso, a focus group discussion with members of the General Directorate for Water Resource of the Ministry of Agriculture Water and Fisheries were not clear who would ultimately be responsible for supporting the application of the assessment tools. The project had proposed that it would be those seeking to introduce technologies. However, there were questions as to whether some of these stakeholders would be willing or able to cover these costs.

"But one thing I need to point out that is critical is that the testing is a little bit expensive. You need to call so many people and we have been discussing on how we make it a little bit less expensive so that it can also be carried out by the district themselves and even lower level government." (Ug/ NG1)

"So actually, the answer here is in two ways: the TAF is easy to use, yet it stands as a long process. From data collection in the field, back to organise workshops, so it is a bit, it is a long process and all, we have to say that this has a cost."(BF/NG_1)

5. 3 Institutional embedding and scale up

Interviews and focus group discussions explored attitude changes around technology

assessment and introduction; the level of adoption; the likelihood of future use within the sector; the level of awareness of innovations within the sector; and the activities required for future adoption.

5.3.1 Attitudes towards technology introduction and assessment

Respondents reported changes in attitudes reflective of the main project innovations. A significant theme to emerge from the data was the demand for a more formalised procedure, which respondents commented could help to make the processes behind technology assessment and introduction more explicit. Having a more explicit process had a number of perceived benefits. In Burkina Faso, the common response was that having a standardised means of assessment would improve coordination within the sector by facilitating knowledge sharing. In Ghana, a major theme was that having standardised and documented procedures would improve transparency within the sector. The reasoning behind this being that sector regulators would have firmer grounds to accept or reject technologies based on set criteria. Respondents in Uganda gave broader answers around ensuring the right technologies were introduced and fewer mistakes being made. Analysis revealed a key mechanism for these changes in attitude was that the Learning Alliance had provided a platform to discuss the area of technology assessment and introduction. Respondents in each country frequently described the project as an "eye opener" with regards to technology issues in the sector. Another mechanism identified was the tool itself. Largely for those involved in the testing and scoring workshop activities, the tool had helped them to identify various shortcomings in their current procedures.

Here two participants taking part in the testing in Ghana explain how their involvement in the Learning Alliances has changed their attitudes towards technology assessment and introduction:

> *"I have been involved in a way; I was interviewed as member of a facilitating organisation. I think the TAF brings to the fore inadequacies in our system of technology introduction, monitoring and assessments." (G/LG_1)*

> *"Well the change would be me. No because prior to this information, we have not even talked of some of these processes. As to oh you can take a technology or innovations through these processes to test whether it is good within certain parameters."(G/NGO_1)*

In Ghana and Uganda, government officials explicitly stated that they had plans to

develop more formalised procedures of technology assessment and introduction:

> *"Now with the coming of the WASHTech and with the development of the TAF we are graduating and trying to see how we can make it more formal now and it is more explicit. Because it used to be like we would just enter into a MoU [Memorandum of Understanding] and issues to do with technology would not be taken very seriously but now with the coming of the WASHTech I think we are graduating to a more formal process." (Ug/NG_1)*

> *"Like I said we have plans to put in place a more formal procedure in trying to use some of the tools we have picked from TAF and WASHTech generally, to put in place a more formal tool, so that when new technologies are being introduced, or even an improved technology is being introduced, we will be able to really support its introduction." (G/NG_2)*

In Ghana, the project had allowed stakeholders within the Community Water and Sanitation Agency to change their perceptions around the introduction of decentralised water technologies. In the early 1990s, the agency passed a decree to standardise the hand pumps used in the country. This policy was introduced as a means of addressing operation and maintenance issues associated with securing spare parts for the numerous models of hand pumps being used in the country. Stakeholders from this organisation reported their involvement in the WASHTech Learning Alliance, which had allowed them to reconsider their position. They reported that they now believed there was scope for introducing new technologies, as long as it was carried out in a controlled manner. Respondents from this organisation also thought the TAF tool presented the opportunity to do this.

An important theme to emerge in both Burkina Faso and Uganda was that the action research around tool development had made them realise the importance of obtaining the perspective of the intended users of the technology.

> *"My main area of interest is the fact that users are given the opportunity to say something about a technology which is being introduced to them and which probably government wants them to use and I think it's confirmed many things around participatory approaches that if you ask people they will tell you, if you work with the communities, with the user's they will tell you that you know, this one is good, it looks beautiful but it doesn't work." (Ug/NGO_1)*

> *"So they got an opportunity to meet and discuss with the grass roots population that were happy of this happening and make it an opportunity to raise issues and get answers. So the WASHTech project brought that good change of*

assessing technologies involving the grassroots population. So himself, he got that new knowledge of assessing technologies before introduction."(BF/LG_2)

5.3.2 Level of institutional embedding

Interviews explored the key mechanisms behind the institutionalisation process and the perceptions of Learning Alliance members about the necessary actions required for future adoption and use within the sector. Regarding the future use of the tools, the most common response in each country was that it was dependent on national government or national offices of utility companies (twenty-one of forty-one respondents). Three main reasons for this were provided by interviewees. Firstly, it was explained that national government bodies or agencies generally dictated practice at the local level. These stakeholders also play a key role in disseminating such practice, be it through sector implementations manuals, legislative frameworks or through their various sector networks. Second, there was a clear need for further capacity building in the use of project innovations at the local level, and national authorities would be able to fund such activities. Third, it was thought that national authorities had an important role in supporting the ongoing implementation of innovations in service delivery within the sector.

"So far all the partners and government official who have attended the workshops and meetings on you know the TAF approved it as a useful tool, they all accepted it but then it's not yet decided by the government, this is the point we are at."[BF/LG_1]

"If TAF is accepted and a policy document is established for implementation, the assemblies will have no choice but to apply it." (G/LG_1)

"And the starting point is to work with the ministry to accept it as one of their tools and then it's included in the sector guidelines as a tool to use by everybody and then everybody will use it. And the monies that go to the district come from the centre. So if they are going to use the district conditional grants to do assessments of technologies and it's not a directive of the sector guidelines, they will not do it."(UG/NGO_2)

With regards to national authorities embracing the tools and championing their future use, ownership was a key theme to emerge from the data. In each country respondents suggested that future adoption was dependent on government having

ownership of the tools.

> *"And now the government really needs to own the project, once they own it he is a hundred percent sure that they will provide the necessary resources and means to keep it going. Once the government accepts it you know he is positive about the future." (BF/NGO_1)*

> *"I think so, I think it will greatly be able to contribute to it, especially if people can understand it and be able to own it then it would be easier to work with because then when you go into the communities and you ask them about these things you as a person need to be able to know what you are talking to them about." (UG/NGO_3)*

> *"Right now it is TREND group, Water Aid and other organisations that are spearheading it. We want government leadership and ownership of the entire project, so if government doesn't own it, then resources will be wasted" (G/NG_4)*

Cross case analysis revealed that the main mechanisms for attaining such ownership were through high levels of engagement in project activities and having a hand in developing the innovation. This is best exemplified through comparison of ownership and adoption in each country. Key informant interviews revealed how the Learning Alliance in Ghana had progressed the furthest in terms of having the tools adopted by government organisation. This was indicated by the fact that host institutions CWSA and the EHSD had began to plan further assessments and training activities beyond the project timeline. The facilitating organisations in Ghana had managed to ensure high levels of participation of key stakeholders from national authorities throughout the course of the project. Respondents from these organisations remarked how this had improved the likelihood of future adoption:

> *"The government participation has been very high because we have a stake in it, both the ministry and the agencies, and it goes a long way to tell how well it will patronised when it comes to its final delivery." (G/NG_3)*

> *"Oh yes, because CWSA is the agency in charge of rural water, and we find the TAF very useful and therefore, I think if the need arises to introduce any new facility from now onwards, we will surely use the TAF"* (G/NG_1)

Conversely, facilitating organisations in Uganda had been slow to engage key government agencies, namely the Ministry of Water and Environment. Learning Alliance members in Uganda felt that this had slowed the institutionalisation process down and may even jeopardise the uptake of project innovations in the future.

"So at the beginning I think the involvement of other stakeholders like the ministry, who is the lead agency, was very poor. Now I can't say it has negative impact, but at least it has dragged the process slower, ok because now the project is ending when we have not completely finalised the process of TAF and the GTI." (UG/NG_1)

"I think that from the beginning it would have been easier to have the ministry on board. Then it would have been taken up by the sector quite easily but bringing them midway was a challenge. Having them not develop the drafts as well, as in we were giving them half done, so asking them to improve on it, so they don't have ownership of it. So I think that will make them take longer to institutionalise it." (UG/NGO_1)

Nonetheless, the national government stakeholders including the Ministry in charge of water and sanitation were positive that the TAF tool would be taken up. They mentioned that the project had come at an opportune moment with the recent formation of the Appropriate Technology Centre in 2011, which operates under the Ministry of Water and Environment. This body was formed with the specific mandate of overseeing WASH technology use within the sector and this was cited as an indication that WASH technology use was on the government agenda. The ATC had been identified as the institutional host of the tool and these stakeholders believed the project innovations would be used by themselves after further adaptation.

Respondents in Burkina Faso suggested the tools needed to be formerly validated by the PN-AEPA steering committee in order for future adoption and use to take place. However, interviews revealed that there was a low level of government awareness of the tools and the progress of the project in general, at the national level. There had been inconsistent involvement of key institutions such as the national water and sanitation utility company. The respondent representing the host institution also commented that there was a low awareness of the project innovations in their organisation and further capacity building was required.

"So actually WASHTech is a new project and actually the tools have not yet been experienced in their directorate. So at this stage, she cannot say whether WASHTech has got any impact on establishing procedures but she hopes that this will happen with the project." (BF/NG_3)

"So actually, the assessment of this TAF tool, we cannot say that it is in the plan to be used yet because we are still awaiting the formal validation. Now, saying

that there is a plan for officially assess all the tools this is not yet officially made as a decision yet." (BF/NG_1)

"There was irregular participation of this institution in the WASHTech project. He himself took part in the last Palm Beach workshop where the technology, I mean the tool was introduced. Yes and some results were also presented to the participants. Now this was a draft version and work was to be done. Now, how far this has gone later, this is not known."(BF/NG_5)

5.3.3 Future actions required

Official approval in Uganda and Burkina Faso

In both Burkina Faso and Uganda, respondents frequently identified the need for the project innovations to undergo an official approval process. In the case of Burkina Faso, this involved presenting the tools for formal validation by the PN-AEPA steering committee. In Uganda, the MoWE also has a policy committee which would need to approve the tools before they could be disseminated throughout the sector. Several respondents representing NGOs and national government suggested that policy approval can be a slow process, which is why it is important for projects seeking to influence policy to engage with these processes at an early stage. Interviews revealed that a key mechanism for instigating policy change was the engagement of influential decision makers in the Learning Alliance.

Training and dissemination

A common theme to emerge from the data was the need for further capacity building in the use of the tools and wider dissemination throughout the sector in each country. Despite the concerted efforts to disseminate project information, government and NGO representatives were almost unanimous in their opinions that there was a need to increase awareness of the tools in the sector, especially at the decentralized level. Generally, it was felt that awareness of project innovations was quite low in each sector. This was especially the case regarding NGOs in Ghana and Uganda.

"For WASHTech, I think the documents have not been shared; they have just been tested in the field with some ministry officials, with the technical support units, with the district water engineers; so I think that is how far they are in circulation."(UG/NGO_1)

"But more could be done especially after the tool has been developed and is

ready for dissemination, maybe more can be done in that area and make sure that everybody understands, and probably when the other issues of policy are also addressed then the whole thing will come out very well."(UG/LG_3)

"One, many of the NGOs are not aware of the process. Secondly, even if they are aware they are not obliged to use the tool."(G/NGO_1)

"Ok yes to really scale up the TAF, there are some majors to be taken. One of those majors would be namely the financial support because the one who is going to implement the TAF will need varied support including the financial support and training. The training is for the implementer to have a good knowledge, ownership and ease of use of the TAF."(BF/LG_4)

The need for further capacity building activities to take place was a clear theme to emerge in each country. Respondents representing national authorities believed there was a clear need for training among stakeholders at the intermediate level. Many respondents explained that the tools were not necessarily intuitive and if they were to be applied effectively there would need to be a process of orientation and capacity building.

"So closely linked to that problem, is the issue of training and dissemination of some of these tools and I think it will be very critical."(G/NG_2)

"Of course the tool needs to be understood to be used properly. I would say usability is fair it may not be very easy to use for those who are not familiar with it, but also it may not be very complicated to use for them, but there needs to be a formal initiation on how to use it so that people fully understand how it is used and how it can benefit them." (UG/LG_3)

"So definitely we would need training for people to be able to implement this. Why? Because this requires various skills, It encompasses such criteria like environmental issues, social issues, all of which make a kind axis of six. So having a good command of these six axis would definitely require some training because people are not necessarily keen to be acquainted with this all at a time unless we train them." (BF/LG_2)

6. Discussion

6.1 Capacity development in the sector

The findings from forty semi-structured interviews and one focus group discussion have revealed many examples of capacity generation amongst individual Learning Alliance members in each country. The majority of respondents reported that they had acquired knowledge about the performance of technology currently being used in the sector and in many cases this had lead to attitudinal changes towards these technologies. There were also numerous examples of how stakeholders had identified barriers to scaling up existing technology and in each country, the results revealed how those involved in the testing and scoring workshops had been able to identify strategies to overcome such barriers. Stakeholders also reported recognising new technologies, which have the potential to be used more widely within the respective sectors. The majority of respondents gained this improved understanding of technology performance through their engagement in action research activities and in the application of the tools at scoring workshops. These activities had allowed stakeholders to develop an understanding of the "field reality" and enabled them to engage with communities using technologies, which was an important mechanism in the realisation of this outcome. Certain respondents involved in core working groups operating at the national level also reported outcomes of knowledge acquisition related to technology performance. However, these respondents usually cited examples from their attendance of scoring workshops.

These findings demonstrate the benefits of conducting action research in service delivery and highlight the importance of conducting these activities using multi-stakeholder participatory platforms, operating at different institutional levels. Without the significant engagement of communities whilst testing the tools, much of the knowledge around technology performance would not have developed. Further, it is clear from the results that the multidisciplinary scoring workshops have allowed stakeholders to form consensus around technology issues.

The findings from this research are unable to provide much insight into the development of organisational capacity bought about by stakeholder involvement in

Learning Alliances. This is largely due to the key informant nature of the study. The interviews were unable to determine the extent to which knowledge generated during project activities had been disseminated throughout stakeholder organisation. However, there were a few interviews, in Ghana and Burkina Faso in particular, which cast some doubt over the notion that new knowledge and practice is disseminated freely in the context of WASH Learning Alliances. For example, a focus group discussion involving a stakeholder organisation in Burkina Faso revealed that knowledge had not passed from their representative in the Learning Alliance to other members of the organisation. Those involved in the focus group, were unaware of the progress with the project innovations and needed updating on the project activities. A similar finding was demonstrated in the WASH utility company in Burkina Faso, as well as the private sector organisation taking part in the Learning Alliance in Ghana. These findings demonstrate the need for further research into the mechanisms of diffusion of information in organisations taking part in WASH Learning Alliances. Research should adopt methods that allow for collection of data around these processes, such as focus group discussions and observational methods. A better understanding of how information is shared within this context will allow those designing and facilitating Learning Alliance programmes to develop strategies to improve the way they share the information generated by Learning Alliance activities.

Institutional capacity is thought to be developed by Learning Alliances when stakeholders from different parts of the sector (e.g. government, NGOs and the private sector) come together to address an area of service delivery. Platforms for interaction allow practices to be shared and may result in increased coordination, accountability and the development of social capital. Institutional capacity development is especially pertinent to the area of technology assessment and introduction in developing country contexts. The issue is complex and requires the unification of stakeholders from different areas of the sector. For example, non-state funded actors such as NGOs and private technology developers need to be encouraged to go through a process of assessment and therefore, need to be aware that such a process exists. National and local government also need to be able to monitor the technologies being introduced into their countries or regions and enforce relevant legislation. In addition, donor organisations funding large scale water and sanitation infrastructure projects need to be on board with the sector approach otherwise they may simply ignore the “rules of the game” (Lockwood and Smits 2011). These are challenges faced to varying degrees in each of the countries involved in this research and it is therefore paramount that change is bought about at the institutional level.

Different cases of enhanced coordination between stakeholders representing different areas of the sector were reported throughout the results. Respondents from the

private sector and NGOs cited several examples of how the multidisciplinary scoring workshops had put them in touch with government authorities, utilities and communities. In certain cases, these interactions had led to improved levels of accountability. For example, the rope pump manufacturers in Burkina Faso and Uganda remarked that they recognised the need to engage with government authorities and communities when introducing and monitoring their technologies. The results also demonstrated how government stakeholders had been able to take account of the frustrations of non-state actors regarding the lack of clear processes for assessment and introduction. Among the respondents representing the private sector, the Biofil technology stands out as an example of how Learning Alliances can contribute to the development of social capital. Stakeholders from this organisation had been able to identify the relevant authorities in the sanitation subsector and were made aware of the processes of technology approval. In turn, key stakeholders from government, utility companies and NGOs had recognised the potential for the company's technology to be scaled up. Again, these reported outcomes of improved coordination and enhanced social capital have largely developed through interactions taking place at multidisciplinary scoring workshops, which have brought together stakeholders who would otherwise work independently.

At a wider level, the Learning Alliance has worked to bring about demand for a more formalised, documented and explicit process of technology introduction and assessment. The results showed how this change in attitude had taken place amongst key stakeholders representing national authorities in Ghana and Uganda in particular. A key mechanism in this development has been the establishment of a platform for interaction to discuss technology issues in the sector. Respondents frequently described the project as an "eye opener" to the current situation of technology use in the sector. Other respondents suggested that the Learning Alliance had brought the issues of technology higher on the agenda of the government. These respondents mentioned that technological issues were talked about but the project had provided the platform to talk about these issues in the open and make their concerns explicit. The tools developed by the Learning Alliances and the associated action research activities were also cited as a key mechanism in bringing about this change in attitude as they had made stakeholders recognise the inadequacies of the current procedures.

At this early stage, it is not clear how far institutional capacity in technology assessment will develop and whether attitudinal changes will be truly institutionalised and converted into expected norms of behaviour and habitualised practices. This is especially the case now that the project has finished; the Learning Alliance platforms are no longer present and there is no external facilitation in place. Thus, the level of capacity brought about by the Learning Alliances will be determined by the ability of

influential stakeholders involved in the project to champion the cause of technology assessment and introduction in the respective sectors.

6.2 Appropriateness of Learning Alliance innovation

The use of the Learning Alliance approach to programme management is proposed to bring about innovation, which is more appropriate to the local context. The basic premise behind this assumption being that by engaging with different institutional levels, development of an innovation will take account of institutional capacity and context. The generation of locally relevant innovation is also seen as one of the ways Learning Alliances can increase the chances of scaling up innovation in service delivery.

Interviews carried out for this study revealed how stakeholders representing different parts of the sector at each institutional level were able to provide feedback for the adaptation of the tools. Stakeholders reported that through the action research phases, the tools were simplified and became easier to use. In particular, the Learning Alliance members' interaction with the users of technologies during the testing of the tools had allowed the members to adapt the questions and make them more suitable for the intended audience. A frequent observation was that initially the data collection was very slow and some of the wording of the questions was difficult to understand but after several rounds of testing, the process became faster as questions were cut out and improved.

Despite the process of refinement over three rounds of field testing, many Learning Alliance members felt that the main project innovation was still too bulky or heavy to use. Furthermore, stakeholders expressed concerns that the processes involved in the testing phase required unrealistic levels of resources in terms of expertise, time and money. Some Learning Alliance members therefore questioned whether there was sufficient capacity to implement these tools at the local level, which is where they perceived the tools being applied. Thus, at the end of this three year project-based Learning Alliance, there remains a gap between what Mikhail and Yoder (2008) describe as conceptual advocacy and practical advocacy. As such, respondents in Uganda and Burkina Faso in particular, frequently suggested that there was a need for further adaptation of the tools as well as a need to decide upon the final means of implementation.

A potential contributory factor in the inability to realise the desired level of

acceptability, lies in the overall design of the project. The main project innovation was externally generated by European partners (albeit with considerable input from country Learning Alliances), rather than developing solutions to the service delivery problem in a truly participatory manner. Had problem definition, direction setting and implementation been carried out in a truly participatory manner, it may have allowed the Learning Alliance to generate innovation in line with the institutional context. Innovation processes would have been more likely to take account of stakeholders' tacit knowledge, regarding institutional capacity. Furthermore, issues such as policy change, finance mechanisms, and capacity generation at the intended level of use may have come to the fore at an earlier stage of the project. Pahl-Wostl et al. (2007) suggest that content management and social involvement are interdependent and cannot be separated. The points identified here relating to implementation of the WASHTech Learning Alliances support this notion.

6.3 Institutionalisation and scale up in Learning Alliances

The mechanisms behind the institutionalisation process in Learning Alliances are relatively unexplored in the literature. As discussed previously, the assumption is that by creating platforms for multidisciplinary interaction at each institutional level and engaging stakeholders in multiparty processes; innovation, institutionalisation and scale up will follow. The current literature points to the key role of the intermediate institutional levels in this process (Smits et al. 2007; Moriarty et al. 2005; Schouten and Moriarty, 2002). Particularly in the case of service delivery innovations intended for the rural WASH sector. However, this study has found interaction at the national level to be paramount in the context of the three participant countries. The majority of Learning Alliance members suggested that ensuring government ownership of project innovations is the most important mechanism for securing future adoption and scale up within the sector. Most interviewees pointed to the role of national government in approving, disseminating and supporting the implementation of innovations in service delivery. The main reason for this being, that local government and NGOs, receive their directives and financial backing from the national level. These findings are consistent with those of Lockwood and Smits (2011) who observed that in many sub-Saharan African countries, processes of decentralisation are largely theoretical, whereby devolution of funding and service authority has not occurred in practice.

The results from this research revealed that ensuring high levels of engagement and participation of government authorities at the national level is a key mechanism in attaining ownership of innovation. In Ghana, where there was high participation of

representatives from key stakeholder organisations throughout the project timeline, participants were generally positive about future adoption and use of the project innovations. Indeed, organisations responsible for hosting the tools were making plans to conduct further technology assessments by applying the TAF tool. In contrast, in Uganda and Burkina Faso, the Learning Alliances had been relatively slow to engage key stakeholder organisations. Particularly in Uganda, respondents suggested that this slow engagement had delayed the process of institutionalisation. However, in Uganda the importance of institutional context was demonstrated. Interviews with National Government bodies revealed that WASH technology issues were very much on the government agenda, illustrated by the recent formation of the ATC. The ATC was developed with a specific mandate to oversee technology use in the sector. Having an organisation such as this host the tools, certainly improves the prospects of future adoption and use within the wider sector. In Burkina Faso, respondents generally expressed the need for a formal validation process by the PN-AEPA steering committee. However, in both Burkina Faso and Uganda, questions remained about whether the host organisations would be able to secure sufficient support for the capacity building, dissemination activities and ongoing implementation of the tools which are clearly needed in the future.

Taking a Learning Alliance approach to programme management has ensured representatives from key government ministries have been engaged in the project and enabled the identification of appropriate government agencies, which can act as institutional hosts for the tools. In the case of each country, the host institutions are mandated to oversee technology use within the sector. This is a strategy which has been used by other project-based Learning Alliances such as the EMPOWERS project, with promising early results (Moriarty et al. 2007). However, the selection of these organisations as institutional hosts by no means guarantees the future application of the innovative practices developed during the project. The results identified a definite need for further capacity building and dissemination activities to take place in each sector. Moreover, there was a distinct lack of clarity about the strategy for conducting such activities and securing the ongoing support and finance necessary. This study highlights the need for a greater understanding about the ways in which Learning Alliances can work with national level stakeholders to create a favourable environment for the eventual implementation of their service delivery solutions. Further research is required to understand the mechanism behind adoption decisions at this level and the subsequent processes of implementation. In the context of short project-based Learning Alliances, the findings from this research demonstrate the need to identify institutional hosts early in the project timeline. This will allows for early identification of the scaling process involved within the respective sector and the development of a clear strategy to achieve institutionalisation.

6.3.1 Dissemination of innovations in Learning Alliances

Dissemination of project information is a key methodological component of most Learning Alliances. Raising awareness of innovation developed by the approach is viewed as a key mechanism in the processes of institutionalisation. The WASHTech project dedicated time and budget accordingly. Indeed, a whole work package of the project was dedicated to dissemination and communication activities. Two communication specialists were recruited by project managers to set up a website and devise communication strategies. Country facilitators also dedicated staff to communication activities.

The project's strategy relied on using a wide array of different media for the purpose of dissemination. A project website was developed, where project reports were shared and consortium partner organisations could contribute to blogs and news' updates. Leaflets about the tools and their application were distributed as well as posted on the website. Project flyers were developed for consortium organisations to hand out at sector events. In Ghana and Uganda, presentations were given by consortium members at sector events in each country and also at international WASH forums. In the last year of the project, two interactive webinars took place, where consortium organisations presented the tools and their experiences working on the project. However, despite the concerted efforts to disseminate project information, government and NGO representatives were almost unanimous in their opinions that there was a need to increase awareness of the tools in the sector, especially at the decentralised level.

In each country, it is possible to identify several factors which may have hindered the dissemination of information. Firstly, the majority of the dissemination activities took place at national level. For example, aside from the regional scoring workshops and a few other workshops in Ghana and Uganda, the majority of presentations appear to have taken place at national level events. Secondly, the nature of the action research, and the fact that a tool was being developed during the project, meant that consortium members felt reluctant to share the unfinished versions of the tool. In Burkina Faso, for example, the Learning Alliance members reported how they were waiting for the finished versions of the TAF tool before sharing it at their main sector event. This also applied at the international level – the finalised tools and technology recommendations were not shared until four months before the project ended. Thus,

in the case of the WASHTech project, it was not possible to achieve the short cycle of dissemination considered desirable in the context of Learning Alliances.

6.3.2 A note on sector enabling environment

The extent to which innovations in service delivery are institutionalised within a sector is not only dependant on the programmatic aspects of a Learning Alliance but also on the sector's institutional and social context. For example, organisational capacity building is reliant on the ability of those taking part in Learning Alliance platforms to disseminate and institutionalise innovation within their work place (Sijbesma et al. 2007). This is, in turn, dependant on the cultures of communication and information sharing in these organisations. The ability to institutionalise new practices throughout the sector is also reliant on the levels of coordination between the various organisations involved in the area of service delivery.

This study revealed certain barriers to the process of organisational capacity building in each country. A major barrier was the ability of facilitating organisations to ensure that regular core group meetings took place and were well attended. Ghana was the only country where the project managed to achieve the expected quarterly core group meetings. Consortium members in each country reported that high level government officials were often too busy to attend core group meetings. This is a difficult problem to overcome, particularly in a relatively small project where large sector events and meetings will invariably take precedence over Learning Alliance activities. However, a representative from the Ministry of Water and Environment in Uganda proposed a possible strategy to overcome this problem: encouraging government officials to sign memorandums of understanding at the beginning of a project, thus allowing for the necessary time and budget allocations to be made. The same interviewee explained how this could also help to improve accountability among these individuals and stimulate information sharing within organisations.

Staff turnover was another significant barrier to organisation and institutional capacity building in all three countries. During the project, lead project facilitators and communication specialists left consortium organisations. Members of the core working groups also moved on. Learning Alliances operating over a long time span are expected to be dynamic in nature with stakeholders entering or leaving as different issues emerge. However, in the context of a three year project, staff turnover can be very disruptive.

In respect of the departure of Learning Alliance members, there are no clear solutions.

It is not possible to prevent Learning Alliance members from changing organisations during the course of the project. Rather, it is best to look for ways to alleviate the disruption this may cause and find potential benefits which can arise from this process. Obviously, it is important for replacement Learning Alliance and consortium members to be found as quickly as possible. It is also important for facilitators to ensure there is an adequate hand-over between organisational representatives leaving the Learning Alliance and their replacements. Any new members joining a Learning Alliance also need to have access to all of the relevant project documentation so they can familiarise themselves with their role quickly. A potential benefit which could arise from staff turnover is that it creates opportunities to build capacity and raise awareness in new organisations. It is therefore important to keep those leaving Learning Alliance organisations up to date with activities and encourage them to introduce the principles and practices in their new organisations. The issue of staff turnover in facilitating organisations can also be very disruptive to a Learning Alliance, as these individuals drive the learning agenda forward and ensure Learning Alliance members are engaged. The only means of ensuring the required continuity in this process is to employ full time facilitators, dedicated to the project. Again, this may be difficult to attain in a small project with limited resources.

An area of the Learning Alliance approach which demands closer scrutiny is the way in which innovation in WASH service delivery is diffused in the context of sub-Saharan Africa. The WASHTech project Learning Alliance struggled to attain awareness of their main innovations within the participant countries, particularly at a regional or district level. However, it is important to note that in each country there are very few platforms, providing opportunities for knowledge sharing and dissemination of information at this regional level. In Ghana and Uganda learning platforms have begun to emerge in recent years however, in Burkina Faso, there is a distinct lack of learning platforms operating at this intermediate institutional level. There is clearly a demand for further detailed research into the mechanism behind diffusion processes and the contextual factors influencing their effectiveness in this context. The use of the Learning Alliance approach presents an excellent opportunity to shape the institutions within which they work and to develop a more cohesive and coordinated learning environment within a sector. Learning Alliances therefore need to share their experiences around communication and dissemination, in order for best practices in this domain to be identified. This will also allow future programmes using the approach to tailor their interventions accordingly and further contribute to the knowledge base.

Sijbesma et al. (2007) discuss how the time and resources required to set-up platforms at different institutional levels, makes it difficult to harmonize the Learning Alliance

approach with current project approaches to implementation. The findings from this study support this observation. It is clear that certain components of both the innovation process and the ability to institutionalise and scale up project innovations have been affected by such constraints. For example, at the beginning of the project there was little time to establish core working groups and this affected the ability to conduct a thorough stakeholder and problem analysis in a participatory manner. With regards to stakeholder analysis, interviews revealed that some important stakeholders may have been left out of the Learning Alliance or not engaged early enough in the project timeline. A short project timeline also meant that the innovation addressing technology assessment and introduction were largely predefined, as was the research protocol for its development. Therefore, perhaps the most important institutional contextual element governing the way project-based Learning Alliances are implemented, lies in the way donors fund such projects. Learning Alliances rely on institutionalisation of innovative practices. These processes are likely to take much longer than the conventional three year project timeline. This study has demonstrated the need for advocacy towards donors taking a longer term approach to sustainable development and a more flexible attitude towards project outputs. The current approach is somewhat paradoxical. On the one hand, donors fund short term projects and demand measurable outcomes but on the other hand, this is clearly limiting the ability of project-based Learning Alliances to achieve long term and sustainable benefits.

Innovations in praxis such as Learning Alliances offer up new opportunities to influence donor institutions. However, in order for this to happen they must be involved in the learning process. In the context of WASH it is also appropriate that these actors are involved, as these are key stakeholders in service provision within the sector. Therefore, it is important for Learning Alliances to engage donor organisations in their processes as much as feasibly possible. This may require programme architects to develop new strategies to ensure these stakeholders are sufficiently engaged. When donor organisations are sufficiently involved in the learning processes, they will be able to realise the constraints exerted by short project timelines on the realisation of improved governance and service delivery.

6.4 Research strengths and limitations

6.4.1 Timing of data collection

The interviews took place between the end of May 2013 and the end of July 2013 meaning that the last interviews were being carried out a full five months before the end of the WASHTech project. This has certain implications for the study. Firstly, many of potential outcomes of the project were yet to materialize and will not do so until several years after the project has finished. This means that in many cases, the study was only able to report proximate indicators of change rather than more concrete realised outcomes. The timing of the research means that it is hard to determine whether actors reporting intentions to change behaviour, will indeed execute these changes, or sustain them when the project has finished and is no longer fresh in their minds or being pushed by local partners on the ground. It is not yet known whether the WASHTech innovations or the concepts of formalised and explicit procedures for technology assessment and introduction will be taken up within the respective countries. Thus, it is difficult to ascertain the truly essential mechanisms of change or contextual conditions necessary to scale up service delivery innovations. Furthermore, it is also not possible to identify the long term impacts such changes would have for the delivery of WASH services. Therefore, a key recommendation from this research is for donors and development organisations to take account of the emergent nature of outcomes materialising from complex interventions addressing issues such as governance and capacity building. Evaluations of such projects need to be carried out after the project has finished, and in certain cases, several years after.

6.4.2 Sampling

The stakeholders selected to participate had all had at least some involvement with the project; be it through participating in core group meetings and tool development; or through involvement in the testing phase; or other promotional activities. At the time in which the interviews were scheduled to take place, the project was still too new to interview stakeholders who had not been directly involved. The tools had not been adopted or widely disseminated throughout the respective sectors and (as reported in the results) awareness outside of Learning Alliance members was generally low. This brings into question the objectivity of the participant interviewees. When someone has invested time and effort in a project they are likely to look at the

intervention more favourably than a neutral observer.

The key informant nature of this study is another limitation which can be identified. In Learning Alliances, individual representatives take part in project activities on behalf of their organisations. The interviews targeted these individuals as key informants about the innovations produced by the project and their intentions to adopt the approach in the future. However, as Gallivan (2001) explains regarding organisational adoption, this type of study design provides no opportunity to validate findings with other members of the organisation. It also means that it is not possible to infer any insights into the efficacy of dissemination activities at an organisational level. To provide an example from this study, it was only possible to gain insight into the level of awareness of the project and the tools at an organisational level, when a focus group discussion was conducted with approximately twenty members of a governmental organisation in Burkina Faso. This is certainly worth considering in future projects seeking to gain understanding of the processes of organisational adoption in Learning Alliances.

6.4.3 Generalisability of findings

The generalisability of qualitative research is often questioned because the context in which a study takes place is regarded to be paramount and it is thought that no intervention will work in the same way in different contexts. However, there are certain factors, which help to strengthen the generalisability of this study. The WASHTech project took place in the WASH sectors of three different countries in sub-Saharan Africa, all with different contextual factors at play. Although the interventions and activities of the project varied slightly between the different countries, they were very similar. The sampling, data collection and analysis techniques for this study were applied in the same way for all three countries. Therefore, where outcomes and mechanisms of the project have been found to apply across all three country contexts, this certainly adds weight to the prospect that these findings are likely to be found if interventions are applied to similar contexts.

7. Conclusion

The Learning Alliance approach is in its nascence within the context of the WASH sector. As such, many of the theoretical concepts are relatively underdeveloped. Nonetheless, WASH development organisations are increasingly employing Learning Alliances as an approach to programme management as a means to enhance their ability to scale up appropriate innovations in service delivery. Therefore, it is important to gain a greater level of conceptual understanding about the mechanisms involved in the approach, in order for development organisations to target their interventions and maximise their efficacy.

This study has demonstrated that conducting action research in a multidisciplinary manner and involving stakeholders at multiple institutional levels provides a fertile ground for the generation of capacity among stakeholders taking part in Learning Alliances. This was demonstrated through the numerous accounts of knowledge acquisition, development of social capital and enhanced coordination, among stakeholders taking part in the WASHTech Learning Alliances. The use of platforms for interaction at different institutional levels, has allowed stakeholders to appreciate the various issues with technology and technology assessment in the respective countries. This research has found action research activities at the community and intermediate levels to be a particularly important mechanism in the achievement of this understanding. The research has also revealed changes in attitude towards technology assessment and introduction policy and practice. Key stakeholders in each country have recognised the importance of adopting formalised and documented procedures. If such procedures are adopted in each sector, this has the ability to bring about a clearer process for non-governmental actors and in turn, improve coordination between sector players.

In order for the true potential of the WASHTech project to be reached, in terms of improving service delivery to end beneficiaries, the changes in attitude brought about by the project need to be converted into policy and practice within the sector. This will allow for rigorous assessments of WASH technologies lead to the use of technology options, which provide improved levels of service. The research has investigated the mechanisms involved in the processes of institutionalising such practice, in each sector. In the context of the participant countries, a key finding from this research is the importance of ensuring innovations generated in Learning Alliances are taken up at the level of national government. These stakeholders have a key role in dictating sector practice at the decentralised level through policy development, finance and dissemination of new procedures. This finding was demonstrated through the

consensus among respondents taking part in this study that the future use of the tools was reliant on government actions. The research also revealed that stakeholders believed that creating ownership of project innovations among government authorities was an important mechanism in securing adoption at this level. The most effective way of achieving this is through ensuring high levels of engagement of these stakeholders in the development of service delivery innovation. In this study, this was illustrated by the different accounts from stakeholders taking part in Learning Alliances regarding the institutionalisation processes in their respective countries. Ideally government officials need to be engaged in a truly participatory manner throughout the processes of problem identification, direction setting and generation of service delivery solutions. Involvement of these stakeholders in each of these processes will ensure innovation is developed in line with the institutional context and will take account of the institutional capacity within the sector. Investigation into the stakeholder perceptions of the main innovation developed by Learning Alliances, support this notion. The results demonstrated that even after three round of testing the TAF tool, respondents still felt the tool was heavy to use and had concerns as to whether there was the capacity to implement the tools at the intended level of use.

In the context of a short three year project-based Learning Alliance there is always likely to be challenges around ensuring sufficient involvement of key government stakeholders in the development of service delivery innovation. However, this research has demonstrated that where these constraints exist, early and sustained engagement with national authorities is crucial. This allows for Learning Alliances to identify the key mechanisms behind policy change, dissemination of new practice, and capacity generation in the area of innovation. However, further research is needed to investigate how platforms operating at the national level, can work to create a favourable policy environment for the ongoing implementation and scale up of service delivery innovations developed through the Learning Alliance approach.

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Appendices

APPENDIX A: Interview Questions

Interview questions for national and regional authorities including utilities

Section 1: Procedures, Practices, Policy, Strategies

1.1 If an NGO or private sector organisation contacts you about introducing a new technology at the decentralised level; what would be the approval processes which would take place before the technology can be introduced?"

- Who is approached initially
- Who/which organisations are involved in the process and what would their roles be?
- Is the process formalised, is it documented? Will there be the same process for every organisation?

1.2 How are these procedures the same or different to processes which would take place three years ago?

- Probe questions to establish whether WASHTech has had any influence in changes.

1.3 How do external organisations (e.g NGO's, private sector organisations) access information regarding the approval process? And, are there any plans to make the process clearer to outside organisations?

- Probe questions to establish whether WASHTech activities have a role to play in any changes mentioned.
- Can you identify the factors driving any changes which have occurred and the process behind the changes?

1.4 When assessing whether a technology is appropriate for introduction at a decentralised level what are the main factors which are considered?

1.5 How are these factors the same or different to those which would be considered three years ago?

- Probe questions to determine whether WASHTech has had any influence

1.6 Is there any form of certification to confirm a technology has been approved for use within the country? If not are there any plans to introduce certification into the sector?

- If there are changes or plans for change, can they identity the factors driving the changes?
- Probe to investigate any WASHTech involvement in these processes

1.7 Do all projects introducing new technologies have to comply with the governmental approval process and if not how do you control what is being introduced?

- Are there any plans or strategies to enhance control of the technologies being introduced and how would you go about doing this?
- Probe to investigate any role WASHTech activities could have had identifying issue of control of introduction and strategies developed.

1.8 Are you aware of any national or regional government strategies to increase involvement of NGOs or private sector organisations in technology assessment and introduction?

- Can you identify these strategies and explain what drove the changes to take place?

1.9 Are there national standards and guidelines for water and sanitation technologies to be used in decentralised settings?

- Have any changes been made to these guidelines, if so what are they?
- If changes have occurred when did they happen and what drove the decision to change the guidelines/standards?

1.10 Are you aware of any new strategies within your organisation or in the WASH sector as a whole, to improve introduction and up-take of certain technologies?

- If so can you provide an example?
- Probe questions to determine any contribution WASHTech work may have had

1.11 Are you aware of any plans, strategies for scaling-up the use of any new technologies?

- If so which ones and what factors drove the technology to be considered for wider introduction?
- Probes for WASHTech involvement.

1.12 Are you aware of any new plans within your organisation or the sector as a whole to change the way technology performance is monitored?

- If so in what way?
- Where did the plans for change come from? Probe as to whether WASHTech has had any role in identifying need to improve monitoring.

1.13 How is communication and coordination between different parts of the WASH sector in (country name)?

- Probes to find out how WASHTech might have influenced communication and coordination.

Section 2: Knowledge and attitudes

2.1 Has your attitude to any of the technologies used in ..... changed over the last 3 years?

- Can you explain the reasons for the change in perception/attitude you have towards these technologies?
- Probe questions for WASHTech influence

2.2 Can you identify some of the barriers to scaling-up technologies being introduced at the decentralised level?

- Probe to ascertain whether WASHTech activities helped you to identify any of these barriers.

- Have any strategies for overcoming these barriers been developed?

Section 3: Gauge the degree of adoption of the TAF and its ease of use

3.1 Have you encountered the TAF?

- If so can you explain where you first encountered the TAF and any other situations where you have come across it since?

3.2 Have you ever used the TAF in a testing scenario? If so how did you find using it?

- How did the session run?
- Can you identify both ways in which it hindered and helped the process of technology assessment?

3.3 Do you think it has a role to play in the assessment and introduction of WASH technologies at a decentralised level? And if so, how do you think it would be applied?

3.4 In your opinion, does the TAF add anything to technology assessment, or were the assessment criteria things that would ordinarily be considered anyway?

3.5 Are there any plans to integrate any aspects of the TAF into your organisations procedures, practices or policy?

- If so, can you explain the ways in which it would be applied?

3.6 Have you ever encountered the GTIP?

- If so can you explain were you have encountered it?
- What was your opinion of the GTIP?
- Are there any plans to integrate any aspects of the GTIP into your organisations practices, procedures and how would it be used etc.?

Section 4: Other important questions

4.1 Can you identify any changes which have developed within your organisation or the WASH sector as a whole which can be directly attributed to WASHTech activities?

- What alternative influences could have driven these changes?

4.2 What factors do you think will determine the success/failure of the WASHTech project in terms of bringing about long term impacts?

4.3 Can you identify any potential negative impacts which have/could be bought about by the WASHTech project?

4.4 How do you feel hygiene has been addressed by the WASHTech project?

- Probe to get there perspective of how hygiene could be integrated into similar projects in the future.

4.4 What has been your involvement with the WASHTech project?

Interview Questions NGOs

Section 1: Procedures, Practices, Policy, Strategies

1.14 If an NGO wanted to introduce a new technology into the country which had not previously been used here, what would be the procedures that you would have to go through before the technology could be introduced?

- Who is approached initially
- Who/which organisations are involved in the process and what would their roles be?
- Is the process formalised, is it documented? Will there be the same process for every organisation?

1.15 How are these procedures the same or different to the processes which would have taken place three years ago?

- Probe questions to establish whether WASHTech has had any influence in changes.

1.16 How do external organisations like NGO's access information regarding the approval process? And, are you aware of any plans to make the process clearer to outside organisations?

- Probe questions to establish whether WASHTech activities have a role to play in any changes mentioned.
- Can you identify the factors driving any changes which have occurred and the process behind the changes?

1.17 When assessing whether a technology is appropriate for introduction at a decentralised level what are the main factors are considered within your organisation?

1.18 How are these factors the same or different to those which would be considered three years ago?

- How have the criteria/factors considered been influenced by WASHTech involvement?

1.19 Are you aware of any form of certification to confirm a technology has been approved for use within the country? If not are you aware of any plans to introduce certification into the sector?

- If there are changes or plans for change, can they identity the factors driving the changes?
- Probe to investigate any WASHTech involvement in these processes.

1.20 Do all organisations introducing new technologies have to go through the governmental approval process?

- Are they aware of any plans or strategies to enhance control of the technologies being introduced?
- Probe to investigate any role WASHTech activities could have had identifying issue of control of introduction and strategies developed.

1.21 Are you aware of any national or regional government strategies to increase NGO involvement in technology assessment and introduction?

- Can you identify these strategies and explain what drove the changes to take place?

1.22 Are you aware of any national standards or guidelines for water and sanitation technologies to be used in decentralised settings?

- Have any changes been made to these guidelines, if so what are they?
- If changes have occurred when did they happen and what drove the decision to change the guidelines/standards?

1.23 Are you aware of any new strategies within your organisation or in the WASH sector as a whole, to improve introduction and up-take of certain technologies?

- If so can you provide an example?
- Probe questions to determine any contribution WASHTech work may have had?

1.24 Are you aware of any plans or strategies within your organisation or the WASH sector as a whole for scaling-up any different technologies?

- If so which ones and what factors drove the technology to be considered for wider introduction?
- Probes for WASHTech involvement.

1.25 Are you aware of any new plans within your organisation or the sector as a whole to change the way technology performance is monitored?

- If so in what way?
- Where did the plans for change come from? Probe as to whether WASHTech has had any role in identifying need to improve monitoring or has a role to play in monitoring of technology performance in the future.

1.26 How is communication and coordination between different parts of the WASH sector in…….?

- Prompts to find out how WASHTech might have influenced communication and coordination.

Section 2: Knowledge and attitudes

2.3 Has your attitude to any of the technologies used in Ghana changed over the last 3 years?

- Can you explain the reasons for the change in perception/attitude you have towards these technologies?
-

2.4 Can you identify some of the barriers to scaling-up technologies being introduced at a decentralised level?

- Probes to ascertain whether WASHTech activities have helped to identify barriers to scale up or have a potential role to play in identifying barriers in the future.
- Are you aware of any strategies developed within your organisation, or within the sector as a whole, to overcome the barriers you have identified?

Section 3: Gauge the degree of adoption of the TAF and its ease of use

3.3 Have you encountered the TAF?

- If so can you explain where you first encountered the TAF and any other situations where you have come across it since?
- What are your opinions of the tool do you think it will be easy/difficult to use?

3.4 Have you ever used the TAF in a testing scenario? If so how did you find using it?

- How did the session run?
- Can you identify both ways in which it hindered and helped the process of technology assessment?

3.3 Do you think it has a role to play in the assessment and introduction of WASH technologies at a decentralised level? And if so, how do you think it would be applied?

3.7 In your opinion, does the TAF add anything to technology assessment, or were the assessment criteria things that would ordinarily be considered anyway?

3.8 Are there any plans to integrate any aspects of the TAF into your organisations procedures, practices or policy?

- If so, can you explain the ways in which it would be applied?

3.9 Have you ever encountered the GTIP?

- If so can you explain were you have encountered it?
- What was your opinion of the GTIP?
- Are there any plans to integrate any aspects of the GTIP into your organisations practices, procedures and how would it be used etc.?

Section 4: Other important questions

4.5 Can you identify any changes which have developed within your organisation or the WASH sector as a whole which can be directly attributed to WASHTech activities?

- What alternative influences could have driven these changes?

4.6 What factors do you think will determine the success/failure of the WASHTech project in terms of bringing about long term impacts in the area of technology assessment and introduction?

4.7 Can you identify any potential negative impacts which have/could be bought about by the WASHTech project?

4.8 How do you feel hygiene has been addressed by the WASHTech project?

- Probe to get there perspective of how hygiene could be integrated into similar projects in the future.

4.5 Can you briefly describe your involvement with the WASHTech project so far?

Interview questions for private sector/research

Section 1: Procedures, Practices, Policy, Strategies

1.27 If you wanted to introduce a newly developed technology into the country now, what would be the procedures that you would have to go through before the technology could start to be introduced?

- Who is approached initially
- Who/which organisations are involved in the process and what would their roles be?
- Is the process formalised, is it documented? Will there be the same process for every organisation?

1.28 How are these procedures the same or different to processes which would take place three years ago?

- Probe questions to establish whether WASHTech has had any influence in changes.

1.29 How do external organisations (non-governmental/private sector) access information regarding the approval process? And, are you aware of any plans to make the process clearer to outside organisations?

- Probe questions to establish whether WASHTech activities have a role to play in any changes mentioned.
- Can you identify the factors driving any changes which have occurred and the process behind the changes?

1.30 When assessing whether a technology is appropriate for introduction at a decentralised level what are the main factors are considered?

1.31 How are these factors the same or different to those which would be considered three years ago?

- How have the criteria/factors considered been influenced by WASHTech involvement?

1.32 Are you aware of any form of certification to confirm a technology has been approved for use within the country? If not are you aware of any plans to introduce certification into the sector?

- If there are changes or plans for change, can they identity the factors driving the changes?
- Probe to investigate any WASHTech involvement in these processes.

1.33 Do all organisations introducing new technologies have to go through the governmental approval process?

- Are they aware of any plans or strategies to enhance control of the technologies being introduced?
- Probe to investigate any role WASHTech activities could have had identifying issue of control of introduction and strategies developed.

1.34 Are you aware of any national or regional government strategies to increase involvement of private sector organisations in technology assessment and introduction?

- Can you identify these strategies and explain what drove the changes to take place?

1.35 Are you aware of any national standards or guidelines for water and sanitation technologies to be used in decentralised settings?

- Have any changes been made to these guidelines, if so what are they?
- If changes have occurred when did they happen and what drove the decision to change the guidelines/standards?

1.36 Are you aware of any new strategies within your organisation or in the WASH sector as a whole, to improve introduction and up-take of certain technologies?

- If so can you provide an example?
- Probe questions to determine any contribution WASHTech work may have had?

1.37 Have you developed any plans/strategies or had any opportunities for scaling-up your technologies or technologies you use?

- If so which ones and what factors drove the technology to be considered for wider introduction?
- Probes for WASHTech involvement.

1.38 Are you aware of any new plans within your organisation or the sector as a whole to change the way technology performance is monitored?

- If so in what way?
- Where did the plans for change come from? Probe as to whether WASHTech has had any role in identifying need to improve monitoring.

1.39 How is communication and coordination between different parts of the WASH sector in…….?

- Prompts to find out how WASHTech might have influenced communication and coordination.

Section 2: Knowledge and attitudes

2.1 Can you identify some of the barriers to scaling-up technology being introduced at a decentralised level?

- Probes to ascertain whether WASHTech activities have helped to identify barriers to scale up.
- Are you aware of any strategies developed within your organisation, or within the sector as a whole, to overcome the barriers you have identified?

Section 3: Gauge the degree of adoption of the TAF and its ease of use

3.5 Have you encountered the TAF?

- If so can you explain where you first encountered the TAF and any other situations where you have come across it since?

3.6 Have you ever used the TAF in a testing scenario? If so how did you find using it?

- How did the session run?
- Can you identify both ways in which it hindered and helped the process of technology assessment?

3.3 Do you think it has a role to play in the assessment and introduction of WASH technologies at a decentralised level? And if so, how do you think it would be applied?

3.10 In your opinion, does the TAF add anything to technology assessment, or were the assessment criteria things that would ordinarily be considered anyway?

3.11 Are there any plans to integrate any aspects of the TAF into your organisations procedures, practices or policy?

- If so, can you explain the ways in which it would be applied?

3.12 Have you ever encountered the GTIP?

- If so can you explain were you have encountered it?
- What was your opinion of the GTIP?
- Are there any plans to integrate any aspects of the GTIP into your organisations practices, procedures and how would it be used etc.?

Section 4: Other important questions

4.9 Can you identify any changes which have developed within your organisation or the WASH sector as a whole which can be directly attributed to WASHTech activities?

- What alternative influences could have driven these changes?

4.10 What factors do you think will determine the success/failure of the WASHTech project in terms of bringing about long term impacts?

4.11 Can you identify any potential negative impacts which have/could be bought about by the WASHTech project?

4.12 How do you feel hygiene has been addressed by the WASHTech project?

- Probe to get their perspective of how hygiene could be integrated into similar projects in the future.

4.4 What has been your involvement with the WASHTech project?

APPENDIX B: Study consent form

WASHTech Impact Assessment: Informed Consent for Participation

Title of Project: WASHTech Impact Assessment

Principle investigator: Simon Taylor – MSc by Research
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Purpose of the Study: The purpose of this research is to investigate the effects which the WASHTech project has had on technology assessment and innovation, within the water, sanitation and hygiene sector in Ghana. It also seeks to understand the contextual factors influencing the WASHTech project.
Procedures to be followed: You will take part in a semi-structured interview, with 24 main questions combined with follow up questions where it is deemed appropriate by the interviewer.
Discomforts and risks: There are no risks associated with participating in this research beyond those experienced in everyday life.
Benefits: You may learn more about yourself and your role within the WASH sector by participating in the study. The study may also help you understand your influence in WASH technology approval and innovation.

This research will help to identify how capacity in WASH technology assessment and innovation may be built within the WASH sector. It will also act to inform subsequent projects aiming to build capacity in other countries within sub-Saharan Africa.
Duration: The interview process is expected to take approximately 30 to 45 minutes.

Statement of Confidentiality: Your participation in this study is confidential. The data will be stored at project coordinating offices with all electronic documents stored in password protected files. In the event of a publication or presentation relating to the research, no personally identifiable information will be shared.

Voluntary Participation: Your decision to be involved in this research is voluntary. You can stop the interview at any time and recorded information can be dropped from the study at your request. You do not have to answer question which you do not want to answer. Refusal to take part or withdrawal from the study will involve no penalty or loss of benefits you would receive otherwise.

If you agree to take part in this study and the information which is outlined above, please sign your name and indicate the date below.

_____ _____

Participant Signature Date

_____ _____

Person Obtaining Consent Date

APPENDIX C: Tables of Interviews

Table of Interviews – Burkina Faso

Interviewee ID	Organisation	Type of organisation	Gender	Project involvement
BF/NG_1	DGRE	National Government	M	Core working group/ scoring workshops
BF/NG_2	DGAEUE	National Government	M	Core working group
BF/NG_3	DEIE	National Government	F	Core working group/ scoring workshops
BF/NG_4	DGRE_FG	National Government	M	Stakeholder organisation
BF/NG_5	ONEA	National Government/ Utility Co.	M	Stakeholder organisation/ consortium meeting
BF/LG_1	Regional WASH office – Tenkodogo	Local Government	M	Testing/scoring workshops
BF/LG_2	Regional WASH office Koudougou	Local Government	M	Testing/ scoring workshops
BF/LG_3	WASH representative of Local Authority – Tenkodogo	Local Government	M	Testing/ scoring workshops
BF/LG_4	WASH representative of Local Authority Koudougou	Local Government	M	Testing/scoring workshops
BF/LG_5	ONEA – municipality of Koudougou	Utility Co. Regional level	F	Scoring workshops
BF/NGO_1	WASH Implementation NGO Tenkodogo	NGO	M	Testing/scoring workshops
BF/NGO_2	AMG – Koudougou	NGO	M	Testing/scoring workshops

BF/NGO_3	Water Aid – Burkina Faso	INGO	M	Facilitation / testing scoring workshops
BF/NGO_4	WSA – Burkina Faso	INGO	M	Facilitation
BF/RS_1	Agro Action	Research Organisation	M	Field testing/scoring workshops
BF/PS_1	Rope pump manufacture – Tenkodogo	Private sector	M	Field testing/ scoring workshops
BF/PS_2	Rope pump manufacture – Koudougou	Private sector	M	Field testing/scoring workshops
BF/PS_3	Rope pump manufacture - Ougadougou	Private sector	M	Field testing/scoring workshops

Table of Interviews - Ghana

Interview ID	**Organisation**	**Type of Organisation**	**Gender**	**Project Involvement**
G/NG_1	CWSA	National Government	F	Core working group/scoring workshops
G/NG_2	Ministries of Local Government and Rural Development Environmental Health and Sanitation Directorate (EHSD)	National Government	M	Core working group/scoring workshops
G/NG_3	Water Directorate Ministry of Water resources Works and Housing (MWRWH)	National Government	M	Core working group/scoring workshops
G/NG_4	School Health Education Programme	National Government	F	Core working group/ testing
G/LG_1	Kumasi municipal Assembly	Local Government	M	Field testing/facilitation

				Scoring Workshop
G/LG_2	CWSA Regional office	Local Government	M	Field testing/scoring Workshop
G/NGO_1	CONIWAS	Umbrella organisation for WASH NGOs	M	Core working group/ scoring workshops
G/NGO_2	Plan Ghana	NGO	M	Core working group/ scoring workshops
G/NGO_3	UNICEF/previously Water Aid	NGO / Intergovernmental Organisation	M	Core working group / facilitation
G/NGO_4	TREND	NGO	M	Facilitating organisation
G/PS_1	Biofil	Private sector/ Technology developer	M&F	Product tested by project

Table of Interviews - Uganda

Interview ID	**Organisation**	**Type of organisation**	**Gender**	**Project involvement**
Ug/NG_1	Ministry of Water and Environment	National Government	M	Core working group
Ug/NG_2	Appropriate Technology Centre	National Government	M&F	Core working group/Scoring workshops
Ug/LG_1	Technical Support Unit 1	Local Government	F	Testing/Scoring workshops
Ug/LG_2	Technical Support Unit 5	Local Government	F	Testing/Scoring workshops
Ug/LG_3	District Water office – Jinja District	Local Government	M	Testing/Scoring workshops
Ug/NGO_1	French Development Agency/ previously facilitation role with WA	NGO	F	Facilitation and core working group
Ug/NGO_2	IRC	NGO	F	Core working group/Scoring

				workshops
Ug/NGO_3	Uganda Rain Water Association	NGO	F	Core working group/scoring workshops
Ug/NGO_4	Netwas	NGO	M	Facilitating organisation
Ug/PS_1	Private sector/ research and development	Private sector/ research	M	Attended dissemination events / core working group meetings
Ug/PS_2	Private sector	Private sector technology manufacturers	M	Testing/scoring workshops